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THESIS

**ARMY TRANSFORMATION AND THE FUTURE COMBAT
SYSTEM**

by

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March 2008

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ARMY TRANSFORMATION AND THE FUTURE COMBAT SYSTEM

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Submitted in partial fulfillment of the
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ABSTRACT

This thesis examines current efforts to transform the U.S. Army to face new challenges. The Army's transformation is based on the development of the Future Combat System (FCS), initiated in 1999. The FCS consists of eight new manned vehicles, various unmanned sensors, robotic vehicles, and remote controlled missiles, all connected by a common network. Critics of the Army's transformation contend that this equipment and associated doctrine is based on traditional Cold War scenarios rather than the types of challenges the Army is likely to face. This thesis examines whether the FCS is influenced by traditional preferences for certain types of doctrine, equipment, and capabilities. To do this, the development of the Army's current capabilities, through past reforms, is first described. Second, the influence of tradition on the development of future capabilities is examined. Third, the potential for FCS to achieve its design goals is measured in both technical and strategic terms. Fourth, the manner in which FCS capabilities relate to irregular warfare is examined from the perspective of the Army's combat arms branches. Finally, considering the significance of institutional culture and past reforms, this thesis determines if outdated traditional considerations influence current Army transformation efforts.

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I attended a class taught by Dr. Wirtz during the first two hours of my graduate school experience, not really knowing what to expect. In this class, I learned about some of the theories regarding international relations and the functioning of complex institutions, or lack thereof. His encouragement and help in editing this work is greatly appreciated.

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I. ARMY TRANSFORMATION

On October 12, 1999, Army Chief of Staff, General Eric Shinseki unveiled a dramatic plan to transform the U.S. Army. He shocked the Army community by announcing that lighter, faster, and more fuel-efficient vehicles would eventually phase out heavy vehicles such as Abrams tank sometime during the 21st century. These new vehicles would be the basis for a force that was strategically responsive and dominant across the full spectrum of operations. Shinseki's audience consisted of attendees to the annual Association of the United States Army (AUSA) conference in Washington, D.C. This audience was purposefully chosen, as it typically contains a large number of defense contractors with display booths eager to peddle their latest wares. The direct appeal to industry served to provide "irreversible momentum" for transformation, although Shinseki was careful to mention that transformation was not about "shiny new equipment."¹

The plan called for an "Objective Force" equipped with a Future Combat System (FCS) that would eventually replace units organized around the Abrams tank. The exact design of this system was not yet determined with the hope that a "systems approach" might stimulate professional and corporate interest. In the meantime, an "Interim Force" would use current technology to test new operational concepts. The design parameters for the new equipment revolved around the goal of deploying a brigade in 96 hours to anywhere in the world, followed by a division in 120 hours, and five divisions in a month.²

As transformation efforts gathered momentum, on June 14, 2001, U.S. Army Training and Doctrine Command (TRADOC) issued a new version of its capstone *Operations* manual, and the entire Army donned black berets.³ Currently, the U.S. Army

¹ Joe Burlass. "Shinseki Leaves Indelible Legacy of Irreversible Momentum." Shinseki Farewell article. At: <http://www.army.mil/features/ShinsekiFarewell/FarewellArticle.htm> Accessed on 25 Feb 08.

² Alan Vick, David Orletsky, Bruce Pirnie, and Seth Jones. "The Stryker Brigade Combat Team: Rethinking Strategic Responsiveness and Deployment Options." (Santa Monica, CA: RAND, 2002), iii.

³ The next version of this manual is scheduled for release on February 28, 2008.

officially defines FCS and its purpose with the following statement: “Future Combat Systems (FCS) is the Army’s modernization program consisting of a family of manned and unmanned systems, connected by a common network, that enables the modular force, providing our Soldiers and leaders with leading-edge technologies and capabilities allowing them to dominate in complex environments.”⁴ The FCS consists of eight new manned vehicles, various unmanned sensors, robotic vehicles, and remote controlled missiles, all connected by a common network, as illustrated in the figure below:

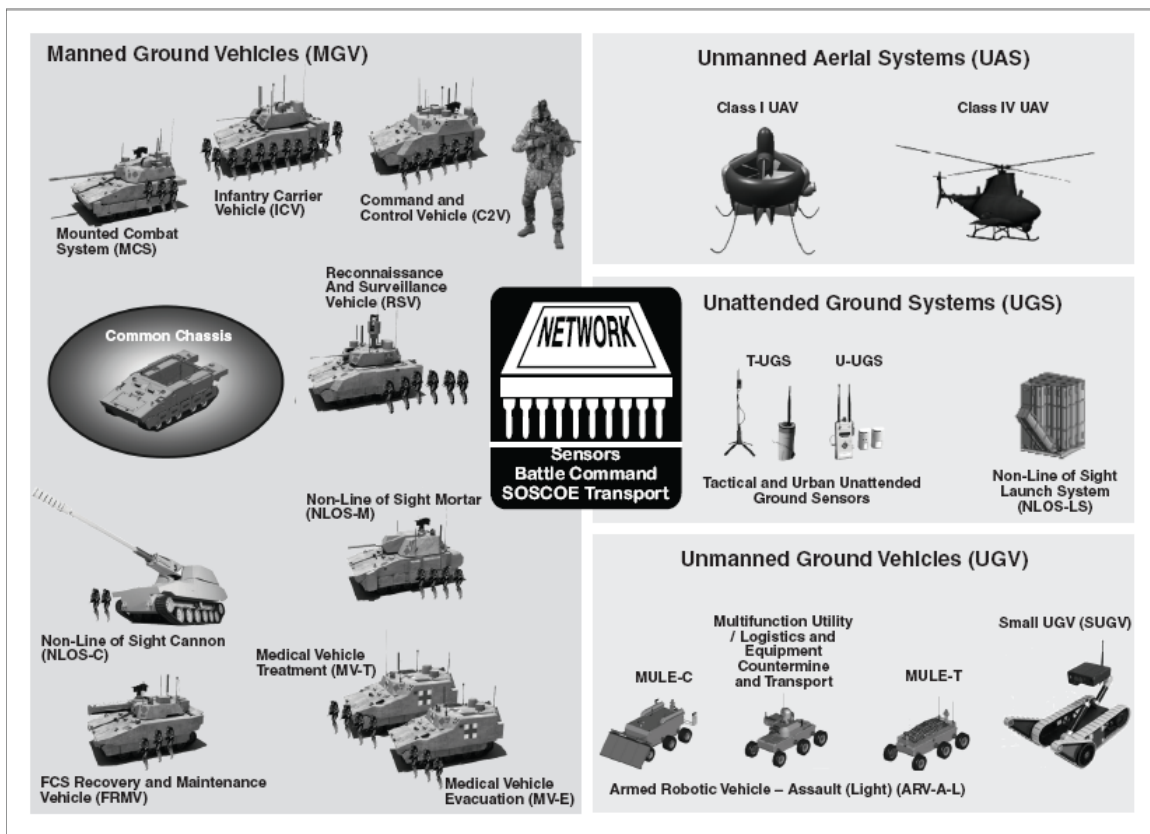


Figure 1: The Future Combat System (From GAO)

The term “Interim Force” is no longer used today, as it is already part of the current force, consisting of the Stryker Brigade Combat Teams (SBCTs). Instead of “Objective Force,” the term “Future Force” is currently used to describe the components depicted in

⁴ According to the Army’s official FCS website; At: <http://www.army.mil/fcs>. Accessed on 25 Feb 08.

Figure 1.⁵ This equipment is intended to allow the U.S. Army to “retain a decisive military-technological edge” and to have more capabilities for “irregular combat.”⁶

Since 1999, the FCS program has grown to include over 550 contracts and subcontracts in 41 states and 220 congressional districts.⁷ A former Army officer and current congressional staffer declared, “When a program gets to a certain size, in the billions, it employs so many people in so many districts you can’t kill it.”⁸ Today, it is the second most expensive program on the defense budget, following the Joint Strike Fighter.⁹ Critics of the Army’s transformation contend that this equipment and associated doctrine is based on traditional Cold War scenarios rather than the types of challenges the Army is likely to face.

This thesis examines whether the FCS is influenced by traditional preferences for certain types of doctrine, equipment, and capabilities. To do this, it first describes the development of the Army’s current capabilities. Second, the influence of tradition on the development of future capabilities is examined. Third, the potential for FCS to achieve its design goals is measured in both technical and strategic terms. Fourth, the manner in which FCS capabilities relate to irregular warfare is examined from the perspective of the Army’s combat arms branches. Finally, considering the significance of institutional culture and past reforms, this thesis determines if outdated traditional considerations influence current Army transformation efforts.

Chapter II describes the development of the Army’s current force structure. The 2006 *Quadrennial Defense Review* states that current military capabilities are suited for traditional challenges. This chapter determines the origins of the Army’s doctrinal focus on traditional conventional operations. Military doctrine is a component of national

⁵ Thomas Adams. *The Army After Next*. (Westport, CT: Praeger, 2006), 183.

⁶ Official FCS website; At: <http://www.army.mil/fcs>. Accessed on 25 Feb 08.

⁷ Alec Klein. “The Army’s \$200 Billion Makeover.” *Washington Post*. (7 December 2007), A01.

⁸ *Ibid.*, A01.

⁹ Paul L. Francis. “Defense Acquisitions: Future Combat System Challenges and Prospects for Success.” Testimony on the Subcommittee for Airland, Committee on Armed Services, U.S. Senate. (Washington, D.C.: Government Accountability Office, 2005), 14.

security policy that addresses how military forces should be structured and employed.¹⁰ After Vietnam, Training and Doctrine Command (TRADOC) provided the impetus for U.S. Army doctrinal reforms.¹¹ TRADOC was established in 1973, and serves as a centralized brain for the Army. Today, the organization's website states, "TRADOC is the Architect of the Army, and *thinks for the Army* to meet the demands of a Nation at war while simultaneously anticipating solutions to the challenges of tomorrow."¹² TRADOC produces the Army's doctrinal manuals, and is influential in training and weapons procurement.¹³ This chapter describes how past doctrine, training, and equipment, combined with changes in the personnel system, led to the development of today's capabilities.

Chapter III traces the development of new uniforms to determine if they indicate a change in focus for the Army. During the Cold War, the U.S. Army focused on a potential conflict in Europe against the Soviet Union. In *Masks of War*, Carl Builder argues this focus fit with the Army's traditional conceptions of war, as the terrain itself is influential on doctrine:

Terrain as a word does not have deep meaning to the nonsoldier, but to the soldier it is everything. It is the fixed field within which he operates. It is the opponent that he must face no matter who may be his enemy. It is the fact of terrain that establishes the field within which the soldier's professional intellect must generate its plans.¹⁴

Builder argues the terrain in Europe was ideally suited for a balance of power among infantry, artillery, and armor proponents, while desert terrain might require more armor, and jungle terrain might require more infantry.¹⁵ Certainly, the enemy's actions matter

¹⁰ Barry Posen. *The Sources of Military Doctrine*. (Ithica and London: Cornell University Press, 1984), 13.

¹¹ Christina Fishback. "U.S. Army's Reaction to FM 100-5." Master's Thesis Draft. (Manhattan: Kansas State University, 2008). Introduction.

¹² U.S. Army Training and Doctrine Command. At: <http://www.tradoc.army.mil/about.htm>.

¹³ For example, the current commander of TRADOC works in conjunction with the AUSA to develop the AUSA's official lobbying position for force modernization in terms of specific programs. In turn, the AUSA, with cooperation from industry, lobbies Congress and Presidential Administrations with its budget objectives. From: AUSA website. At: <http://www.ausa.org/WEBINT/DeptGovAffairs.nsf/byid/JRAY-6VBPQL>. Accessed on 22 Feb 08.

¹⁴ Builder, 88. He quotes Admiral J.C. Wylie as saying this.

¹⁵ Ibid., 189.

just as much as the terrain. In any case, during past reforms, the Army introduced a new uniform to signify it was undergoing change. This trend was foreshadowed with the simultaneous adoption of the beret and *FM 3-0 Operations* in June 2001. By 2004, transformation efforts increased pace, and the Army introduced a new camouflage pattern to replace the use of desert camouflage. The design characteristics of the FCS are evident when the new uniform is examined from the perspective of institutional culture.

Chapter IV assesses the strategic responsiveness of the FCS, in terms of how fast it can deploy, and the role of networked sensors in lieu of heavy armor protection. The FCS is intended to deploy by aircraft in order to meet Shinseki's deployment goals. This is known as air-mechanization. The first section of this chapter examines deployment times and logistical requirements for the FCS. Additionally, this section offers two historical cases of rapid deployment of mechanized forces with aircraft into a hostile environment in order to assess the political and strategic characteristics of Shinseki's technical objectives. The second section of this chapter assesses the possibilities and limitations of using networked sensors for increased situational awareness. This analysis describes the software component of FCS, and frames it alongside recent examples of networked systems in combat scenarios.

Chapter V examines FCS components as they relate to the Army's combat arms branches, and the manner they are intended for irregular warfare. Additionally, it examines the role of budget politics in force modernization. Politics is a struggle for power over who decides in an organization. The budget is the manner in which funds are distributed in an organization. For the U.S. Army, budget politics is a matter of who decides how money is spent within the institution as well as how much money is received in relation to other services. The FCS relies heavily on long-range strike systems. This creates tension with the U.S. Air Force, and may detract from irregular warfare capabilities. This chapter examines these considerations.

After considering past reforms, FCS capabilities, irregular warfare, and budget politics, Chapter VI concludes whether traditional considerations continue to influence the Army's current transformation.

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II. TRADITIONAL WARFARE

The *Quadrennial Defense Review* (QDR) defines traditional warfare as a familiar form of war fought by conventional forces in which the enemy is a nation-state.¹⁶ In the QDR, an elaborate chart illustrates that “today’s capability portfolio” is suited for “traditional challenges.”

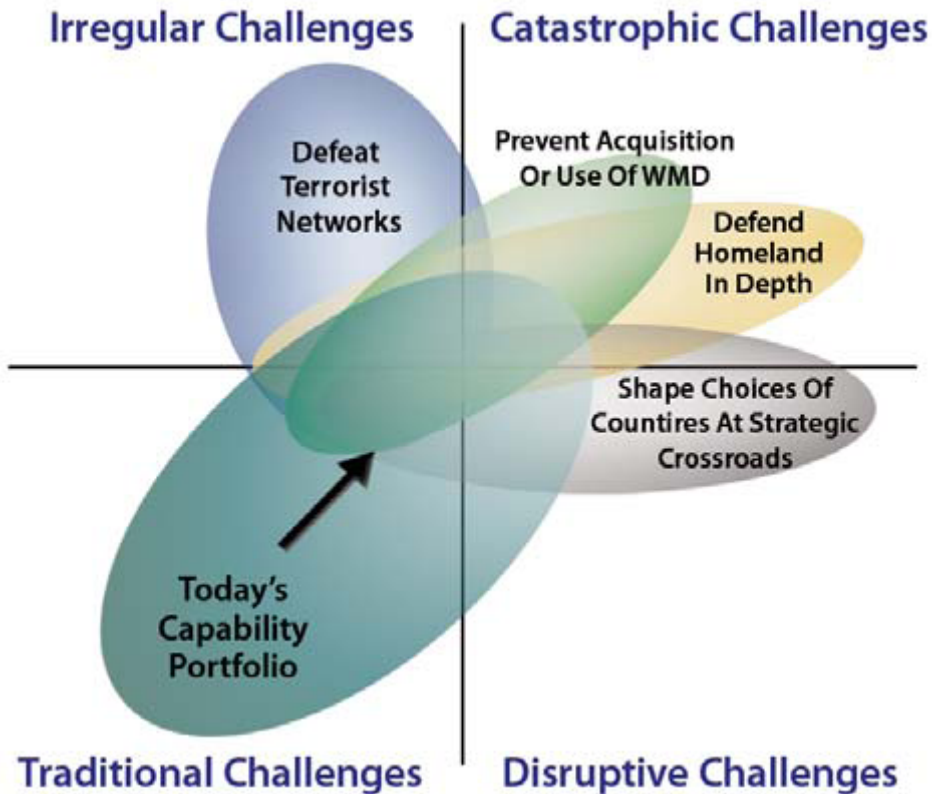


Figure 2: Shifting Focus (From QDR)

The arrow dictates that the military must shift the development of capabilities and “transform” to face new types of challenges.¹⁷ Use of the word “traditional” to describe a form of warfare implies that the military has a level of institutional culture capable of influence over preference for types of doctrine, organization, and equipment. This

¹⁶ Department of Defense. *Quadrennial Defense Review*. (Washington, D.C., 2006), vi.

¹⁷ Before the publication of the QDR, the U.S. Army believed it was already transforming. This is evident because planners took this chart from the QDR and made a PowerPoint slide with the heading, “Future Combat System.”

chapter will clarify this categorization for the U.S. Army, since the QDR's definition may not be useful for a specific service's military planner, and each service has peculiar traditions that are not necessarily similar. The QDR is one of many publications (among both government and academia) expressing concern that obsolete Cold War requirements may continue to influence doctrine and equipment procurement programs in the U.S. Army. If "today's capability portfolio" is based on traditional warfare, then a better understanding of how that portfolio emerged will determine whether "traditional challenges" continue to influence current Army transformation.

In *The Masks of War*, Carl Builder argues the Army's dominant conception of war originates from its finest hours in the last year of World War II. He states, "In self-imagery, nothing the Army has done since, in Korea or Vietnam, can compare with who it was and what it was doing from June 1944 to May 1945."¹⁸ Builder believes the power of this institutional memory continues to influence the Army's doctrinal preferences for tanks and artillery despite the possibility this focus may not be suited for emerging challenges.

To explore the influence of traditional conceptions of war, this chapter considers the U.S. Army's doctrinal developments following the Vietnam War through the development of current AirLand Battle Doctrine. This period involves significant changes in the social, political, and strategic environment facing the planner: the failure in Vietnam, the end of the draft, the end of the Cold War, success in the first Gulf War, and the development of new Army doctrine during a period of uncertainty. The institutional mindset that evolved during latter half of the Cold War emphasized traditional challenges. Doctrine during this period provides a context to examine current developments. This context is necessary to consider the notion that military institutions have a distinct culture that may create a bias toward the development of particular doctrines that are unsuited for contemporary challenges. The analysis of past Army doctrine will center on field manuals, equipment procurement, personnel systems, and training.

¹⁸ Carl Builder. *The Masks of War*. A RAND Corporation Research Study. (Baltimore: Johns Hopkins University Press, 1989), 132.

A. POST-VIETNAM ARMY AND ORIGINS OF TRADITIONAL WARFARE

Military institutions have always preferred to fight on familiar terms. This phenomenon has taken shape in different forms throughout history. During the Vietnam War, a frustrated commanding Army General stated, “I will be damned if I will permit the U.S. Army, its institutions, its doctrine and its traditions to be destroyed just to win this lousy war.”¹⁹ The Vietnam War, however, was not the first time warriors faced a form of fighting they did not prefer. Robert O’Connell observed this phenomenon in the *Iliad*, when Diomedes addresses Paris with the following passage:

You archer, foul fighter, lovely in your locks, eyer of young girls. If you were to make trial of me in strong combat with (traditional) weapons, your bow would do you no good at all.²⁰

If Paris is placed in the context of the recent QDR, then he would likely fall into the category of “irregular challenges.” Diomedes claim, on the other hand, expresses the cultural attitude behind “traditional warfare” during his time. For Diomedes, traditional warfare involved close armored combat. Another character from the *Iliad*, Idomeneus, reinforces this attitude by stating, “My way is not to make my battles standing far away from my enemies.”²¹ At the beginning of the 20th Century, these preferences experienced a violent reversal.²² Modern weapons can strike targets at a global range with devastating effect. Cultural attitudes of military institutions have shifted full circle, embracing the technological possibilities of fighting at a distance. During Vietnam, however, extensive bombardment by aircraft and artillery did not bring victory. For the U.S. Army, failure in Vietnam haunted the traditional essence of the warrior, having

¹⁹ Keith Johnson. “Mission Impossible.” *Time Magazine*. (8 February 1971), 1; It is also quoted, but with a different wording, in Michael Maclear. “Westy’s War.” *The Ten Thousand Day War*. (New York: St. Martin’s, 1981), 195; It has the same wording as the older quotation in *The New American Militarism* by Andrew Bacevich, 37.

²⁰ Robert O’Connell. *Of Arms and Men*. (New York and Oxford: Oxford University Press, 1989), 48.

²¹ Ibid.,.

²² Jonathan B.A. Bailey. “The First World War and the Birth of Modern Warfare.” *The Dynamics of Military Revolution, 1300-2050*. Ed. Macgregor Knox and Williamson Murray. (Cambridge and New York: Cambridge University Press, 2001); Even with the widespread adoption of firearms in the 17th Century, fighting still occurred at visual range, with a return to linear formations developed by military reformers who were inspired by reading Vegetius. From: Michael Roberts. “The Military Revolution, 1560-1660.” *The Military Revolution Debate*. Ed. Clifford Rogers. (Boulder, CO: Westview Press, 1995), 14.

experienced defeat by an adversary that remained distant, yet occasionally offered battle at a fiercely close range. Although weapons have evolved since Homer wrote the *Iliad*, the attitudes and psychology behind them remain influential for military institutions.

In 1976, the Army's capstone doctrinal manual stated, "All great armies of the world rest their land combat power upon the tank."²³ This manual initiated a process of doctrinal reforms aimed at restoring the Army's confidence in the aftermath of the Vietnam War.²⁴ Armies have always sought to combine striking power, mobility, and protection.²⁵ The tank served as the quintessential weapon system, through the promise that these capabilities could merge in one platform, reinforcing traditional cultural conceptions of war. The attitudes behind various weapon systems and their employment fall into functional categories. These categories are the medium through which military culture is preserved.²⁶ Tradition becomes an impediment to modernization when military culture stabilizes these functional categories to a degree that impedes the optimization of new technology.²⁷

Since the inception of the U.S. Army Chief of Staff position in 1903, only five officers from the artillery branch have served in the position, while 25 originated from

²³ Department of the Army. *FM 100-5, Operations*. (Washington, D.C.: Government Printing Office, 1976), 2-2.

²⁴ Ironically, at the time this was written, the conventional North Vietnamese Army rumbled through South Vietnam with columns of Soviet-made T-34 tanks, thereby uniting the country under their control.

²⁵ Michael Roberts. "The Military Revolution, 1560-1660." *The Military Revolution Debate*. Ed. Clifford Rogers. (Boulder, CO: Westview Press, 1995), 13.

²⁶ O'Connell, 7.

²⁷ For these reasons, the U.S. Army is currently undergoing a "transformation" of its functional categories. This transformation consists of changes in the personnel system as well as the development of the Future Combat System. Personnel changes include mergers between similar traditional branch functions into various categories such as maneuver, fires, effects, logistics, and maneuver support. Maneuver will consist of infantry, aviation, and armor branches. Fires will consist of field artillery and air defense artillery branches. Logistics will consist of transportation, ordinance, and quartermaster branches. Maneuver support will consist of engineer, chemical, and military police branches. Source: Human Resources Command. https://www.hrc.army.mil/site/Active/opmd/Branch_Homepages.htm. Accessed on 21 Feb 08.

the armor (cavalry) and infantry branches.²⁸ Regardless, all three branches, through a “fraternal relationship,” involving mutual turf protection, hold power over the Army, and promote a unified view of conventional combined arms operations.²⁹ Social, political, technological, and strategic factors affect the development of doctrine, yet these considerations first pass through a powerful cultural medium before emerging in U.S. Army doctrine.

It is no mere coincidence that the Army changed its slogan three times during the 1970s and used three different slogans in the current decade.³⁰ Rapidly changing mottos are a sure sign of crisis. After Vietnam, the Army restored its confidence with a renewed focus on conventional doctrine and new equipment. The threat of Warsaw Pact forces in Europe legitimized the Army’s avoidance of counterinsurgency during the 1970s. In contrast, after the current war in Iraq, it is unlikely that a similar conventional threat will emerge to allow the Army to ignore developing full spectrum capabilities. Yet the absence of a competitor that might pose a significant conventional threat does not imply that the Army can overcome the institutional inertia that some have argued characterizes its preoccupation with conventional operations.

B. SOURCES OF U.S. ARMY DOCTRINE

The U.S. Army can trace its doctrinal origins to Jomini's principle of "offensive action to mass forces against weaker enemy forces at some decisive point if strategy is to lead to victory."³¹ The United States Military Academy translated Jomini's book, *The Art*

²⁸ The first two Chiefs of Staff from the artillery branch served during World War I, but this did not occur again until William Westmoreland. Other notable exceptions: General Erik Shinseki served in the artillery as a Lieutenant, but later switched to Armor (Cavalry) as a Captain. In contrast, General Peter Schoomaker served in Armor initially, switching to a career in Special Forces as a Captain. Source: William Gardner Bell. *Commanding Generals and Chiefs of Staff, 1775-2005*. (Washington, D.C.: United States Army Center of Military History, 2005). At: <http://www.history.army.mil/books/cg%26csa/CG-TOC.htm>.

²⁹ Builder, 189.

³⁰ In 1971 the Army's slogan was "Today's Army Wants To Join You," in 1973, "Join The People Who've Joined The Army," in 1978, "This Is The Army," in 1981, "Be All That You Can Be," in 2001, "Army Of One," and in 2006, "Army Strong." Source: Mary Kate Chambers and David Verdum. "Army Recruiting Messages Help Keep the Army Rolling Along." *United States Army News*. (09 October 2006) At: <http://www.army.mil/-news/2006/10/09/322-army-recruiting-messages-help-keep-army-rolling-along/>

³¹ John Nagl, *Learning to Eat Soup with a Knife*, (Chicago: University of Chicago Press, 2005), 17.

of War, in 1862. The preface to this edition states "As the existence of a large, well-instructed standing army is deemed incompatible with our institutions, it becomes the more important that military information be as extensively diffused as possible among the people."³² This statement reveals that U.S. Army officers sought Jomini's principles and clung to them ever so tightly due to American political constraints on maintaining a professional army. This was the motivation for West Point to translate the work in the first place. Once the constraints on the maintenance of a standing army were removed, the U.S. Army began to fully embrace Jominian notions of warfare.

Because Jomini's reputation was later surpassed by that of Clausewitz, army doctrine is often incorrectly attributed to Clausewitz.³³ Both Clausewitz and Jomini mention the importance of being strong at some "decisive point." However, Jomini writes of massing at the "decisive point" in absolute terms, while Clausewitz says "the principle of concentration will not have the same results in every war," and additionally points out that "the best strategy is always to be very strong."³⁴ Jomini's scientific framework often appeals to those desiring a quick and cheap victory, while the latter statements of Clausewitz allude to the complexity of war and are difficult to incorporate into a rigid doctrine. The development of modern maneuver warfare theory is attributed to Jomini's principles.³⁵ Jomini's work was already widely read and disseminated during the period examined, while a good English translation of Clausewitz did not exist until shortly after the Vietnam War in 1976.³⁶

The U.S. Army's conservative interpretation of the 1976 translation of *On War* is best epitomized in retired Army Colonel Harry Summers book *On Strategy: A Critical*

³² Baron Antoine Henri de Jomini. *The Art of War*. (J.P Lippincott & Co.: Philadelphia, 1862), xii

³³ Clausewitz's famous work was published after his death by his widow, and did not exist in English until 1874.

³⁴ Carl von Clausewitz. *On War*. Edited and translated by Michael Howard and Peter Paret. (Princeton: Princeton University Press, 1976), 204.

³⁵ Robert Leonhard. *The Art of Maneuver: Maneuver Warfare Theory and AirLand Battle*. (New York: Ballantine Publishing Group, 1991).

³⁶ Clausewitz. *On War*; Also: Christopher Bassford, *Clausewitz in English*. (New York: Oxford University Press, 1994) Although a previous version of the work existed in English and was in print by Penguin Books, it was never very popular among military officers or on the curriculum of CGSC or the Army War College.

Analysis of the Vietnam War.³⁷ This book started as a study commissioned by the Army War College on the "lessons learned" in Vietnam, and eventually became required reading in courses that were part of the curriculum at the Army War College as well as the counterpart Air Force and Navy institutions.³⁸ In this book, Summers concludes that the Vietnam War was lost because politicians did not fully mobilize national resources, and military leaders overemphasized counterinsurgency by way of attacking the Viet Cong (VC) insurgents rather than emphasizing the destruction of the conventional North Vietnamese Army (NVA). Ironically, the appeal of this book at the Army War College suggests that the institution uses *On War* to reinforce its conservative belief that success (or full-spectrum dominance) is possible by using Jominian principles to destroy enemy forces in the field. Furthermore, the institution misuses the idea that politics permeates war at all levels to imply that failure in war is the fault of politicians interfering with the conduct of war at all levels rather than the experts who flawlessly conduct war based on Jomini's principles.

1. Maneuver Without Movement: Tactical Attrition

Maneuver warfare, as a strategy, is characteristic of the weaker side, as it seeks to attain a position of advantage, from a position of overall disadvantage. Attritional strategy, on the other hand, is characteristic of the side that is confident it possesses greater depth of resources. The concept of maneuver becomes confusing in a situation where the position is attained through firepower, without continual movement. This type of situation is one of tactical attrition, where the enemy is worn down with firepower from positions of advantage. This differs from an attritional strategy, and is actually a

³⁷ Harry Summers, *On Strategy: A Critical Analysis of the Vietnam War* (Novato, Ca.: Presidio Press, 1982).

³⁸ Christina Fishback. "U.S. Army's Reaction to FM 100-5." Master's Thesis Draft. (Manhattan: Kansas State University, 2008), 92.

form of maneuver warfare.³⁹ Planners blurred these concepts during Vietnam, and the term “attrition” became unpopular in defense circles afterwards, though it remained the basis for tactical doctrine.

Maneuver and attrition ideas are influential because the Army was historically small in peacetime yet expeditionary in wartime due to the implied limitations of the Constitution and the geographic isolation of the nation. The last time the U.S. Army fought on American soil was during the Civil War. Starting with the Spanish American War in 1898, the U.S. Army has fought its wars overseas and depended on a technological advantage in firepower.⁴⁰ These factors created a necessity for the use of strategic maneuver and tactical attrition. The U.S. Army developed an attritional doctrine throughout most of the Cold War, because such a doctrine called for less manpower. This was complemented by plans for rapid deployment of reserves and allied mobilization in the event of a European theater war with the Soviet Union. The attritional mindset of the U.S. Army is evident in its doctrine with the 3:1 rule, which originates from Lanchester’s square laws, a series of differential equations developed in 1916, relating to the theoretically appropriate attacker to defender ratios with the advent

³⁹ The concept has grown from and emphasis on physically massing forces to instead massing fires, from decentralized positions. Today, the emphasis is on massing the effects of fires rather than the fires themselves, with “effects based operations.”

⁴⁰ Donald Dyal. *Historical Dictionary of the Spanish American War*. (Westport: Greenwood Press, 1996).

of modern artillery.⁴¹ Using this ratio, Army doctrine assumed that a small force could defend from an attack against a force three times its own size, with the proper use of artillery. These ideas relate to conventional defensive situations, and may not apply in other situations.

In an offensive situation involving seizing and holding terrain, indirect firepower cannot serve as the main effort. The military relied on massive amounts of artillery and the use of airpower in Vietnam. During one operation, 366,000 rounds of artillery, combined with 3,235 tons of bombs were used to kill 1,776 Viet Cong.⁴² This amounted to a ratio of around three tons of bombs combined with 206 artillery rounds to kill one enemy soldier.⁴³ Many of these bombs and shells, (5% and 2% respectively) did not explode.⁴⁴ Ironically, during the same time frame as the operation, 6,071 American casualties were attributed to mines and booby traps made using unexploded American ordinance.⁴⁵ U.S. Army doctrine during the Vietnam called for wearing down the enemy by leveraging the advantages of firepower. This was a flawed application of doctrine actually intended for defending Europe from Soviet aggression. The European theater fit with the Army's conceptions of war. The Vietnam War, however, served as a temporary distraction from the Army's preoccupation with conventional operations.

⁴¹ Stephen Biddle. *Military Power*. 17. Biddle is critical of Lanchester's formula because it does not account for the manner in which forces are employed and how non-material factors can influence battle. Although Abraham Lincoln also mentioned such a ratio during the Civil War, such a rigid "rule" was not institutionalized until after Lanchester. His formulas provided a framework by militaries sought to employ modern artillery, continue to be used in systems engineering. Ultimately, war is a complex and chaotic endeavor, and such rigid rules cannot apply. Biddle argues that success and failure in modern war is a factor of the modern system of "force employment" rather than one of technology. He traces various perspectives that explain how armies were able to overcome the advent of modern firepower that rained upon the battlefields of World War I. With modern firepower, the defense of NATO hinged upon the idea of the 3:1 Rule, involving the ratio of attackers necessary to defeat defenders. In *Assessing the Conventional Balance: The 3:1 Rule and its Critics*, John Mearsheimer points out that the troop quality and the numbers and quality of weapons are not compared in the development of the rule.

⁴² During Operation JUNCTION CITY (February -May 1967). See: Andrew Krepinevich. *The Army and Vietnam*. (Baltimore: Johns Hopkins University Press, 1986), 190-191.

⁴³ 3,235 divided by 1,776 and 366,000 divided by 1,776.

⁴⁴ Krepinevich, 201

⁴⁵ Ibid.

C. FIELD MANUALS

The 1976 version of *FM 100-5 Operations*, became known as Active Defense.⁴⁶ The opening pages of this manual purposefully orients the Army on a conventional fight in Europe with the following: "Battle in Central Europe against forces of the Warsaw Pact is the most demanding mission the US Army could be assigned."⁴⁷ Active Defense incorporated views on new technology from 1973 Arab-Israeli War, and argued that the Army needed new weapons to keep pace with advances in modern warfare.⁴⁸ The manual stated, "to win, our soldiers need the best weapons that industry and technology can provide."⁴⁹ An entire chapter of the manual was devoted to a description of modern weapons.⁵⁰ This chapter used elaborate graphs to depict trends in modern war that would require new tanks, artillery, infantry carriers, air defense, and helicopters in order to be successful. The Army believed the weapons it possessed were inadequate, and the defensive nature of the doctrine was based on the idea that the Army did not yet possess the weaponry it needed to respond to a Soviet aggression with a counter-offensive.

Given this consideration, the doctrine stated that the "United States could find itself in a short, intense war" whose outcome would be decided so fast that "the US Army must, above all else, *prepare to win the first battle of the next war*."⁵¹ Additionally, the manual stated that the Army must "prepare to fight outnumbered and win."⁵² To do this, several concepts were introduced, such as the idea of trading space for time, using tactical nuclear weapons, and the idea that "the skillful commander substitutes firepower for manpower whenever he can do so."⁵³ This idea is fundamental to how the U.S. Army pursued reforms during the Cold War, starting with the development of tactical nuclear

⁴⁶ James Dunnigan and Raymond Macedonia. *Getting it Right: American Military Reforms after Vietnam to the Gulf War and Beyond*. (New York: William Morrow and Company, 1993), 122.

⁴⁷ *FM 100-5 Operations*. (1976), 1-2.

⁴⁸ Saul Bronfeld. "Fighting Outnumbered: The Impact of the Yom Kippur War on the U.S. Army." *Journal of Military History*. Vol. 71 (April 2007), 465-498.

⁴⁹ Department of the Army. *FM 100-5 Operations*. (1976), 1-3.

⁵⁰ *FM 100-5* (1976), Chapter 2.

⁵¹ *Ibid.*, 1.

⁵² *Ibid.*, 1-3.

⁵³ *Ibid.*, 3-4.

weapons during the 1950s. The problem with this idea is that it ignores the political aspects of war, and reduces institutional thought on how to conduct war as nothing more than a “targeting drill” that can be refined through the fields of engineering and operations research.⁵⁴ While such fields play a vital role for military institutions, they can only be useful if directed towards relevant objectives rather than by trying to find ways to optimize the attritional-based targeting methodology that originates from formulas developed in 1916.

Criticisms of the 1976 doctrine were numerous. Its author, General DePuy, spent most of his time defending the doctrine from its critics.⁵⁵ Critics centered on the idea that the doctrine was too passive in nature, and that it focused only on winning the first battle of a war in a country so small (West Germany), that losing two battles would likely result in the loss of the entire country.⁵⁶ It seemed that no one was satisfied with the doctrine, and it served to spark an intense debate about doctrine that culminated in a new doctrine six years later.⁵⁷ Many of the criticisms of the doctrine must be viewed in light of the political situation of the time. American foreign policy during the 1970s was in a period of détente. Also, the aftermath of Vietnam and the resulting domestic politics created constrained defense budgets. Relative to foreign policy and domestic constraints, the only feasible doctrinal option for the Army was one that called for “fighting outnumbered.”⁵⁸

The 1982 version of *Operations* became known as AirLand Battle.⁵⁹ It introduced the idea of deep attacks beyond the forward edge of battle area (FEBA) to disrupt enemy second echelons.⁶⁰ Because it was more offensive in nature, it received less criticism from within the U.S. Army, while causing some initial controversy and

⁵⁴ Frederick Kagan. *Finding the Target*. (New York: Encounter Books, 2006), 359

⁵⁵ Ibid., 57.

⁵⁶ Dunnigan and Macedonia, 126.

⁵⁷ Fishback, 3. The 1976 manual was the starting point for professional interest in doctrine for the United States Army on a level that was not present before.

⁵⁸ Dunnigan and Macedonia, 128.

⁵⁹ Kagan, 59.

⁶⁰ Department of the Army. *FM 100-5 Operations*. (Washington, DC: Government Printing Office, 1982).

confusion with Germany and other NATO allies.⁶¹ The offensive nature of the 1982 doctrine was evident with the reintegration of chemical and nuclear weapons into the deep attack plan.⁶²

The 1986 version of AirLand Battle was mostly the same as the 1982 version, but with one exception. It introduced the term "Follow-On Forces Attack" or FOFA, with the idea that these forces should be attacked simultaneously by air forces and new artillery systems.⁶³ This manual marked an intersection with an Air Force doctrine that called for striking targets deep in enemy territory, and Army doctrine that called for striking targets closer to the forward line of troops (FLOT). Attacking the FOFA was not only a physical target that could be agreed upon by the Air Force and Army, but an intellectual point of convergence for advocates of air power (strategic bombing) and land power. If nothing else, it was true to its name.

The offensive characteristics of AirLand battle concerned German allies because some critics believed it heightened the probability of war by calling for "deep attacks."⁶⁴ These attacks appeared pre-emptive in nature from the German perspective.⁶⁵ The preemptive nature of a defense based upon AirLand Battle doctrine was mistaken by some as a strategically offensive posture. Since the end of World War II, the Germans continually feared that increasing American-Soviet tensions in some other part of world might trigger a conflict in Europe.⁶⁶ AirLand Battle only served to increase the fears of Germans concerned with this possibility because it called for "deep attacks," in the opening stages of a conflict. These fears must be understood in light of the fact that the Germans also were suspicious of the defensive nature of Active Defense, and its idea of

⁶¹ Kagan, 61-65.

⁶² Kagan, 60; Robert A. Monson, "Star Wars and AirLand Battle: Technology, Strategy, and Politics in German-American Relations." *German Studies Review*. Vol. 9, No. 3. (October 1986), 621.

⁶³ FM 100-5 (1986).

⁶⁴ Monson, 619.

⁶⁵ Ibid, 622.

⁶⁶ Ibid, 620.

“trading space for time.”⁶⁷ This is because the “space” NATO traded in a potential conflict with the Soviets may well have been the whole country of Germany and parts of France.⁶⁸

Army reforms after Vietnam were driven by the desire to win the first battle of the next war. This highlights a tendency to think of war as a single battle, and Army field manuals after Vietnam stated the importance of the first battle, without mention of what happens afterwards. This emphasis was due to the fear and uncertainty of nuclear escalation. Loss of the first battle in a Cold War scenario would immediately lead to a choice between nuclear war or capitulation, based on war plans at the time.⁶⁹ Naturally, the Army did not want to face either outcome, so it focused only on first battle scenarios in traditional conventional operations.

This focus was further encouraged by Central Intelligence Agency (CIA) analysis. Based on analysis of Soviet ammunition stockpiles and logistics assets the CIA predicted conditions that might lead to a stalemate if the U.S. Army could prevent or repel a Soviet breakthrough for a period of 14 days.⁷⁰ This time would allow NATO mobilization, and the possibility of a situation resembling that of World War I. The threat of stalemate may seem as a defeatist goal for an army, but if this possibility deterred war with the Soviet Union during the Cold War, then it served its purpose, while clinging loosely to American democratic beliefs regarding the political dangers of standing armies. At the end of World War II, the U.S. Army demobilized, in accordance with democratic traditions. Yet the threat posed by the Soviet Army remained after the war, and required a rapid mobilization in the event of Soviet aggression.

⁶⁷ *FM 100-5* (1976), 6-3. “A commander can trade space for time, or he can trade time for risk.”

⁶⁸ Interestingly, the doctrine of Active Defense was borrowed almost entirely from the German doctrine of *Panzergrenadier*. See: Kagan, 55.

⁶⁹ Colin Powell. *My American Journey*. (New York: Random House, 1996), 313. Planners intended the Vogelsberg Mountain Range to be last defensible position, after which the Soviets were to be attacked by Lance missiles and artillery fired atomic projectiles.

⁷⁰ Director of Central Intelligence, Central Intelligence Agency. “Trends and Developments in Warsaw Pact Theater Forces and Doctrine Through the 1990s.” National Intelligence Estimate, Key Judgments and Executive Summary. (14 November 1989), 9. This section indicated that the Soviets could only sustain combat operations for 30-45 days, provided NATO could seal off or prevent a breakthrough for a period of 14 days. At this point, the Soviets would have to move stocks from the strategic reserve.

This mobilization was practiced annually with REFORGER (from Return of FORces to GERmany) exercises, and entailed the rapid deployment of multiple heavy brigades to Germany.⁷¹ These exercises involved the Military Airlift Command, Military Sealift Command, as well as the Civilian Reserve Airfleet.⁷² In the event of war with the Soviets, the REFORGER exercise would become OPERATION REFORGER, with the goal of moving “ten divisions to Europe in ten days.”⁷³ The name of the exercise implies that forces should have never left Germany following World War II, instead continuing a preventive attack against the Soviet Union immediately after defeating Nazi Germany, while still mobilized.⁷⁴ These exercises continued after the Cold War, until April 1993.⁷⁵ They served to focus planners on rapid deployment requirements and first battle scenarios, in accordance with a doctrine that called for winning the first battle of a potential war.

The inability to think about what happens after the first battle has grave consequences. This preoccupation remains in today’s doctrine, under circumstances different from that of the Cold War. Given a defensive strategy, it may have been helpful to plan on holding out for 14 days in order to deter Soviet aggression by the threat of stalemate, but when invading a country in order to replace its government, it becomes necessary to plan beyond 14 days. When repelling an invader from Kuwait, however, AirLand Battle was ideal. Planning considerations learned from REFOGER exercises were useful, though it required significant time to deploy heavy forces to Saudi Arabia in 1990. Nevertheless, AirLand Battle doctrine received only minor changes after Desert Storm.

⁷¹ Hugh Farington. *Confrontation: The Strategic Geography of NATO and the Warsaw Pact*. (New York: Routledge, 1986), 133.

⁷² Ibid.

⁷³ Thomas L. McNaugher. “Refining Army Transformation.” *U.S. Army and the New National Security Strategy*. Ed. Lynn Davis and Jeremy Shapiro. (Santa Monica: RAND Arroyo Center, 2003), 295.

⁷⁴ General Patton argued against postwar demobilization, suggesting, “Let’s keep our boots polished, bayonets sharpened, and present a picture of force and strength to these people.” Source: Carlo D’Este. *Patton: A Genius for War*. (New York: Harper Perennial, 1995), 735.

⁷⁵ REFORGER. At: <http://www.globalsecurity.org/military/ops/reforger.htm>. Accessed on 20 Feb 08.

The 1993 version of *FM 100-5 Operations* proudly declared AirLand Battle doctrine a success, and found new reasons to continue the focus on rapid deployment and decisive Jominan notions of war. The 1993 version was basically the same as the 1986 manual, but with the addition of a chapter entitled, “Operations Other Than War.”⁷⁶ This chapter concluded that “winning wars” was the Army’s primary mission, and “operations other than war” can be accomplished with the same “leadership, organization, equipment, discipline, and skills gained in training for war.”⁷⁷ As a result of the success with AirLand Battle doctrine during Desert Storm, this manual stated, “The American people expect decisive victory and abhor unnecessary casualties. They prefer quick resolution of conflicts and reserve the right to reconsider their support should any of these conditions not be met.”⁷⁸ Lawrence Freedman argues this presumption created problems for the Army in Kosovo. He describes the manifestation of casualty aversion during operations in Kosovo:

US troops stayed, separated from the society which they were supposed to help calm, in a guarded and well-appointed compound, while the troops of allies intermingled with the local population.⁷⁹

Ultimately, the Army’s problems in Kosovo inspired a dramatic transformation effort. To support this transformation, TRADOC decided to change the nomenclature of the *Operations* series manuals. The Army received the new manual and new headgear on the same day.

On June 14, 2001, the Army’s Birthday, *FM 3-0 Operations* was introduced, accompanied by the black beret. Rapid deployment units typically wear this form of headgear, and its purpose was to emphasize that the entire Army would “transform” so that it could deploy more rapidly. Additionally, *FM 3-0 Operations* mentioned “full-spectrum operations in war and military operations other than war,” in the preface rather than the 13th Chapter. Although this manual included a chapter entitled, “Stability

⁷⁶ Department of the Army. *FM 100-5 Operations*. (Washington, D.C.: Government Printing Office, 1993), 13-0.

⁷⁷ Ibid., 13-8

⁷⁸ Ibid., 1-3.

⁷⁹ Lawrence Freedman. *The Transformation of Strategic Affairs*. The Adelphi Papers. Vol. 45. No. 379. (New York: Routledge, 2006), 58.

Operations,” it was basically the same as previous manuals, but with the addition of the words “full-spectrum” in front of the older concepts throughout the manual. The foreword of the manual, written by General Eric Shinseki, stated:

Warfighting, and by extension less violent actions, depends on a few, “rules of thumb.” First, we win on the offense; we must be able to defend well, but you win on the offense. Next, we want to initiate combat on our own terms – at a time, in a place, and a method of our own choosing – not our adversary’s, our choosing.⁸⁰

This statement reinforced Jominian notions of warfare, and was no different from what Diomedes told Paris in the *Iliad*, 2,700 years ago.

D. EQUIPMENT

Today’s policymakers are constrained by the military capabilities developed during the period after Vietnam because the capabilities necessary for occupying territory are very different than those required for the destruction enemy forces in the field.⁸¹ Pursuing armor protection while substituting firepower for manpower creates limits on the types of political objectives that can be accomplished with a doctrine and associated force structure. Current attempts to reform the Army rely on a doctrine of long-range precision firepower and highly mobile armored forces. These developments are strikingly reminiscent of changes that occurred after Vietnam as evident in the “Big Five” weapon systems.

The conceptualization of the “Big Five,” weapon systems (Abrams, Bradley, Apache, Blackhawk, and Patriot) took place during the 1970s.⁸² TRADOC’s doctrine called for the development of these weapons. During the Reagan years, funding for the “Big Five” increased.⁸³ The Abrams tank came first. After several unsuccessful

⁸⁰ Department of the Army. *FM 3-0 Operations*. (Washington, D.C.: Government Printing Office, 2001), foreword.

⁸¹ Furthermore, it is unrealistic to assume that the Soviet doctrine of deep attack would not target the same logistics assets, such as light trucks and convoys that the United States is frantically armoring in its current war.

⁸² *FM 100-5* (1976). Called for in Chapter 2.

⁸³ Greg Schneider and Renae Merie. “Reagan’s Defense Buildup.” *The Washington Post*. (9 June 2004). Available: <http://www.globalsecurity.org/org/news/2004/040609-reagan-military.htm>.

programs in the 1970s, the new tank arrived to battalions by 1980.⁸⁴ The next year, the Bradley was introduced, because the obsolete M113s infantry vehicles could not keep up with the new tank. The Apache added a capability for Army aviation to attack deeper beyond the FEBA in accordance with the new doctrine. The Patriot was designed to defend the airspace by shooting down aircraft with missiles. This would theoretically allow friendly aircraft operate at the front lines, although air defense doctrine called for shooting everything out of the sky in a high-intensity scenario.⁸⁵

In response to Active Defense and AirLand Battle doctrines, the Army's field artillery branch sought to increase its ability for both close range fire support and deep strikes. The 1977 decision to put fire support teams (FIST) at the company level demonstrates the Army's desire to better direct fires at close ranges. In addition to the FIST concept, division artillery increased from fifty-four to ninety-six 155-mm. self-propelled howitzers.⁸⁶ At longer ranges, the development of Q-36 and Q-37 radars combined with the Army Tactical Missile System (ATACMS) and the Multiple Launch Rocket System (MLRS) increased the capability of the Army's artillery in the deep attack.⁸⁷ Counterbattery radars (Firefinder II) could identify enemy fires up to thirty-six kilometers away and transmit this information, via fire direction control centers, to mobile MLRS and howitzer batteries.⁸⁸ MLRS was designed to replace the Lance missile system, and was required to "use less manpower and have conventional and nuclear capabilities," according to the official history of the U.S. Army Field Artillery Branch.⁸⁹

⁸⁴ Orr Kelly. *King of the Killing Zone: The Story of the M-1*. (New York: W.W. Norton and Company, 1989), 243.

⁸⁵ Department of the Army. FM 44-100. *Air and Missile Defense Operations*. (Washington, D.C.: Government Printing Office, 1997) "Air Defense Weapons Control Status (WCS)," "Weapons Free." In this status, "Weapons can fire at any air target not positively identified as friendly. Threatening theater missiles require no identification before they can be engaged. This is the least restrictive weapon control status." 5-12.

⁸⁶ Boyd L. Dastrup. *King of Battle: A History of the U.S. Army's Field Artillery Branch*. (Fort Monroe: Office of the Command Historian of the United States Army Training and Doctrine Command, 1992), 298.

⁸⁷ The Q-36 and Q-37 radars are currently being used to track the point of origin and point of impact for mortar attacks by insurgents in Iraq.

⁸⁸ Dastrup, 306.

⁸⁹ Ibid., 308.

E. PERSONNEL SYSTEM

The personnel system used by military forces has great influence on the development of military doctrine. In *The Sources of Military Doctrine* Barry Posen points out how the shift in the terms of conscription from three years to one year in the French Army prior to World War II caused a shift in focus from offensive operations to a focus on the defensive, which is best illustrated by the construction of the Maginot Lines.⁹⁰ This phenomenon is based on the idea that offensive operations require extensive training that can only be conducted with a personnel system that allows for more permanent assignment of soldiers.

With this line of reasoning, Richard Lock-Pullan argues that the end of the draft in 1973 was the most significant influence on the development of U.S. Army doctrine thereafter.⁹¹ The end of the draft allowed the military to train its personnel extensively in the tactics necessary for the employment of modern weaponry. The doctrine initially developed in 1976 was very controversial because it was passive in nature and eventually resulted in the more offensive Air-Land Battle doctrine, which was developed in the 1980s and brought success in the offensive phases of both wars in Iraq.⁹² The U.S. Army's current focus on offensive conventional operations is due to the influence of Jomini and a belief that success is only possible by taking the offensive. This manner of thinking may work against counterinsurgency objectives. The end of the draft provided an opportunity for extensive training in counterinsurgency due to personnel stability, but such an opportunity was instead used to reinforce capability for offensive conventional operations, given the threat posed by the Soviet Army.

The American political tradition has been one that is highly suspicious of maintaining a large standing army, and subscribes to the belief that the "citizen soldier" can triumph. After World War II, however, there was a significant shift in such thinking.

⁹⁰ Barry Posen. *The Sources of Military Doctrine*. (Ithaca and London: Cornell University Press, 1984), 30.

⁹¹ Richard Lock-Pullan. "An Inward Looking Time: The United States Army, 1973-1976." *The Journal of Military History*. Vol. 67, No. 2 (April 2003), 483-511.

⁹² While the doctrine was considered more "offensive" in nature, it still was dependent on attrition of the Warsaw Pact at a numerical disadvantage, but with a qualitative advantage in weapons.

This institutional shift was reinforced after Vietnam by perceptions on the changing nature of modern warfare and the fact that using firepower, mechanization, and technology requires professional expertise and training that could no longer be expected from draftees.

In 2004, retired Marine Colonel Thomas Hammes wrote a popular book called *The Sling and the Stone* in which he argued that "4th generation warfare" was a new development in warfare resulting from society's transition from the "industrial age" to the "information age."⁹³ His ideas call for a defense policy that would spend more on people and training rather than technology by arguing that success in future conflict would depend more on the human element. Three decades prior to Hammes' book, U.S. Army doctrine in 1976 provided a different interpretation of this transition by stating that being "accustomed to victory wrought with the weight of materiel and population brought to bear after the onset of hostilities" was no longer relevant because future wars would be decided by existing forces during the initial phases of conflict due to advances in modern weaponry.⁹⁴ U.S. Army officers developed these ideas by observing the 1973 Arab Israeli War, but they are also reflective of the belief that it had become politically impossible to mobilize American society for war as a result of Vietnam.

During Vietnam, President Lyndon B. Johnson refused to mobilize the National Guard and Reserves despite the advice of the Joint Chiefs of Staff.⁹⁵ This advice was politically motivated, and given several years into the Vietnam War. The Army began the war quite confident that it could win with a small force. After the war, however, the Army leadership clung to the notion that the war was lost because politicians did not fully garner the national resources necessary to conduct the war. In any case, many of those that volunteered for service in the Reserves during Vietnam, were only doing so to avoid

⁹³ Thomas Hammes. *The Sling and the Stone*. (St. Paul, Zenith Press, 2004). In this book, Hammes is calling for a greater investment in human skills rather than in technology. Historians point out that 4th Generation Warfare is nothing more than guerilla tactics and insurgency, which is not really a new phenomenon.

⁹⁴ Department of the Army. *FM 100-5 Operations* (1976), 1.

⁹⁵ Lock-Pullan, 502.

the draft. This created a “repository” for those that did not want to be involved in the war, thus affecting the quality the Reserve component in a manner that would have to be addressed during reforms.⁹⁶

In 1971, Secretary of Defense Melvin Laird outlined a concept that would include both active and reserve components of the military as a part of the total force. General Creighton Abrams adopted this idea in 1973, and by 1974, critical units in the National Guard and Army Reserve were paired with active units in order to “round out” the active Army.⁹⁷ This made it difficult for the President to deploy the Army without calling up the reserves. The idea of having to “round out” units would theoretically force the political issue of mobilization prior to the decision to commit the U. S. Army in a future conflict. This would create a political trip-wire for Presidents, lest they be tempted to rely on a professional army to embark upon adventures that lacked authentic popular backing. It was forgotten, however, that the Vietnam War had popular backing when it began, and that the Army initially believed it could win with a small force.

When the Total Force concept was applied to an all-volunteer army, an unexpected phenomenon occurred. With the end of the draft, the level of professionalism in the active duty Army increased. This created tension with the Total Force Concept, however, because Army could not rely on amateurs or reservists as a vital component of ground combat formations without additional training. This is evident in the Gulf War where much of Army Reserve artillery was not cleared to fire “live rounds in proximity to actual troops.”⁹⁸ Another example is that of the 48th Infantry Brigade of the Georgia National Guard. This unit never deployed to the Gulf War, and spent the entire duration of its mobilization at the National Training Center, where army trainers found the brigade

⁹⁶ A 1970 President’s Commission reported that 75-90% of enlisted personnel in the Reserves had joined only to avoid the draft. See: Moss M. Ideka, “Reserve Strength in the Face of the Zero Draft,” *Military Review*. Vol. 53, No. 5 (1973), 87; Richard Lock-Pullan. “An Inward Looking Time: The United States Army, 1973-1976.” *The Journal of Military History*. Vol. 67, No. 2 (April 2003), 492.

⁹⁷ Lock-Pullan, 501.

⁹⁸ *Ibid.*, 502.

so ill-prepared that its commander was relieved.⁹⁹ Decisions made during the 1970s impact the current war in Iraq because nearly 40% of all troops in Iraq during 2004 were from the National Guard or Reserves, combined with a significant portion of civilian contractors.¹⁰⁰

Initially, the Army did not react positively to the end of the draft because it believed that sufficient manpower could not be generated without a draft. In 1975, former Army Chief of Staff William Westmoreland stated that “the all-volunteer force has not produced the military posture required.”¹⁰¹ Donald Rumsfeld served as Secretary of Defense for the Gerald R. Ford administration during this time and oversaw the transition to an all-volunteer Army while simultaneously seeking to reverse what he saw as a 15-20 year trend in the relative decline of U.S. conventional forces.¹⁰² By the time of the thirty-year anniversary of the All-Volunteer Force, President George W. Bush proclaimed it as being fundamental to increasing the effectiveness of the military.¹⁰³ The end of the draft changed the social foundation of the Army, however, and caused a long-term shift in its identity.¹⁰⁴ This shift in identity had the consequence of solidifying the Army’s dependence on indirect firepower and armor protection. The weapon systems developed after Vietnam came to require a certain level of training, professionalism, and competence that may not have been possible in an army of conscripts. As the professionalism increased, highly trained soldiers have become the most valuable component of the institution.

⁹⁹ Lock-Pullan, 502; Also, “Unit Was Mobilized and Treated Badly, Ex-Commander Says.” *New York Times*. (5 March 1991). Furthermore, during Operation Iraqi Freedom in 2005, this same brigade had to be augmented with active duty units, and eventually dismantled and used to guard camps rather than conduct operations.

¹⁰⁰ Sydney Freedberg. “Iraq Burden Shifts from Reserves to Regular Active Duty Troops.” *National Journal*. (16 February 2007). At: <http://www.globalsecurity.org/org/news/2007/070216-iraq-burden.htm>.

¹⁰¹ Ibid., 491.

¹⁰² Christopher Andrew. “For the President’s Eyes Only: Secret Intelligence and the American Presidency from Washington to Bush.” (London: Harper Perennial, 1996), 424.

¹⁰³ George W. Bush. *A Proclamation by the President of the United States on the 30th Anniversary of the All-Volunteer Force*. (1 July 2003) At: <http://www.whitehouse.gov/news/releases/2003/07/20030701-11.html>.

¹⁰⁴ Lock-Pullan, 502.

F. TRAINING REFORMS

While new doctrines evolved after Vietnam, the emphasis on training also continued to increase. Leadership and training were not ignored in a period where the Army relied on massive volumes of indirect fires. In fact, the growing reliance on firepower increased the need for advanced training because of the growing complexity of modern firepower.

In 1986, the book *America's First Battles* by Charles Heller was published. The central theme in this book was that America had consistently lost the first battle of every major war it has been involved.¹⁰⁵ The book quickly gained prominence among members of an institution that believed it could not afford to lose the first battle of the next war.¹⁰⁶ This was a profound change in the outlook of officers in the U.S. Army. The idea that a nation must win the first battle of a war or lose altogether represents an outlook that is very different from one that relies on the weight of industrial mobilization. Such an idea asserts that tactical excellence must make up for some kind of perceived economic (as evident with Germany and Japan during World War II) or geographic (Israel) weakness. The source of the Army's current emphasis on tactical excellence originates from a perception of weakness regarding the end of the draft, and resultant personnel system. In the conclusion of *America's First Battles*, John Shy writes that a lack of training and experience may result in losing first battles. He points out that the central problem of a "democratic society that has never been sympathetic to the occupation of the soldier," is one of generating enough manpower with the technical skills necessary to employ sophisticated weaponry upon the outbreak of modern war.¹⁰⁷

The creation of the National Training Center (NTC), Joint Readiness Training Center (JRTC), and Combat Maneuver Training Center (CMTTC) illustrated a trend of increased training for the army. Training and Doctrine Command was very influential in

¹⁰⁵ Charles Heller. *America's First Battles*.

¹⁰⁶ It was emphasized on the syllabus for a course entitled, *The History of the Military Art* that was part of the curriculum at the United States Military Academy. Cadets were taught to believe that they would determine the outcome of the nation's next battle because of the nature of modern warfare and the distribution of weapon systems with increased firepower under the control of Army officers at lower ranks.

¹⁰⁷ John Shy, "First Battles in Retrospect." Charles E. Heller and William A. Stofft (ed.) *America's First Battles*. 350-352.

the training revolution of the Army. As Deputy Chief of Staff and Training at TRADOC, General Paul Gorman conceptualized the National Training Center as well as numerous training reforms that established highly realistic training.¹⁰⁸ Several accounts of successful performance during Desert Storm were attributed more so to the training revolution than to the Army's new weapons.¹⁰⁹ General Barry McCaffrey went so far as to say: "U.S. Forces in Desert Storm could have won the conflict decisively even if they had swapped their equipment with the Iraqi military."¹¹⁰ He was implying that the actual "revolution in military affairs" was based on people (training and leadership) rather than technology.¹¹¹ In any case, the Army that was successful during Desert Storm was born from reforms during the 1970s and 1980s.

Recent events, such as the end of the draft in 1973, and the success of an all-volunteer force during Desert Storm impact the current development of U.S. Army doctrine and its emphasis towards precision firepower, protection through increased situational awareness, and rapid deployment. One of the most influential factors on U.S. Army doctrine is the fact that its personnel system requires doctrines that compensate for a lack of manpower. Maneuver warfare theories can accommodate for this constraint. The idea that these doctrines are irrelevant for the types of missions that the Army is currently asked to perform does not alter the course of institutional inertia.

After the Korean War, the Army developed a doctrine that theoretically allowed it to fight on a nuclear battlefield with less manpower by using tactical nuclear weapons to halt the advances of the Warsaw Pact in a potential conflict.¹¹² After Vietnam, the Army called for the development of a new generation of conventional weapons that would take advantage of modern technological advances to fight outnumbered. Today, the Army

¹⁰⁸ Christina Fishback, 62.

¹⁰⁹ "American tankers had developed more skill while training than they actually needed in war. Skilled and professional M1 loaders attained a higher rate of fire than the automatic loaders in Iraqi tanks." Kagan, 140.

¹¹⁰ Barry McCaffrey. "Lessons of Desert Storm." *Joint Forces Quarterly*. (Winter 2000-01) However, the article frequently promotes U.S. weapons systems and has a picture of an Abrams tank on first page.

¹¹¹ NTC, JRTC, CTMC and many other training centers were developed during the 70s and 80s, as well as an elaborate system of measuring and defining training objectives.

¹¹² Andrew Bacevich, *The Pentomic Era: The U.S. Army Between Korea and Vietnam*. (Washington, D.C.: National Defense University, 1986).

may be attempting to do the same with its “Future Combat System,” which is based on the idea that “Information Age” technology can reduce manpower.

G. CONCLUSION

The haunting institutional memories of Korea and Vietnam were temporarily put to rest by the Army’s performance during Desert Storm. Shortly after this redeeming experience, however, the Army found itself incapable of performing the tasks that politicians demanded. Former Secretary of State Madeline Albright, a seemingly peace-minded person, best captures politicians’ frustration with the Army’s vision of itself, and its institutional reluctance to do their bidding. In 1996, she asks former General Colin Powell, “What’s the point of having this superb military you’re always talking about if we can’t use it?”¹¹³ This statement angered Powell, who was haunted by memories of piecemeal (un-Jominian) commitment in Vietnam. Madeline Albright was referring to the Army’s reluctance to conduct peacekeeping operations in Bosnia. Inevitably, the Army interpreted these concerns as a matter of how to “lighten” the Army so it could deploy more rapidly. Ironically, this effort served to reinforce traditional considerations, as previously unarmored units were provided with “medium-weight” armored vehicles, thereby actually making the Army heavier overall.¹¹⁴

The idea of short decisive conflict remains in Army modernization plans today. The design requirements for the Future Combat System (FCS) are based on goals that ignore what might happen beyond the first month of a potential future war. For example, one of the goals of the FCS is to deploy a brigade in 96 hours and four brigades in 30 days. After this point, there is less consideration for what might occur, or what type of forces or doctrine is necessary. During the Cold War, this point in time corresponded to the initiation of nuclear war. Current doctrine still reflects this abrupt transition into the unknown, as one of the last chapters in *The Warrior Ethos and Soldier Combat Skills* states:

¹¹³ Powell, 561.

¹¹⁴ Kagan, 249.

An attack occurring without warning is immediately noticeable. The first indication will be very intense light. Heat and initial radiation come with the light, and the blast follows within seconds. Nuclear attack indicators are unmistakable. The bright flash, enormous explosion, high winds, and mushroom shaped cloud clearly indicate a nuclear attack. An enemy attack would normally come without warning. Initial actions must, therefore, be automatic and instinctive. The best hasty protection against a nuclear attack is to take cover behind a hill or in a fighting position, culvert, or ditch. Time available to take protective action will be minimal... You can curl up on one side, but the best position is on the back with knees drawn up to the chest... Remain calm, check for injury, check weapons and equipment for damage, and prepare to continue the mission.¹¹⁵

This advice has not evolved much from the chapters placed towards the end of similar Army manuals written in the 1950's. The difference today, however, is that the latest soldier skills manual has added a chapter on IEDs (Improvised Explosive Devices), at the end of the manual, shortly after instructions on how to survive a nuclear attack.¹¹⁶ The areas that the Army does not believe it can address, such as stability operations, guerilla tactics, or nuclear war, are typically reserved for the final chapters of its manuals.

The influence of older ideas is evident in the U.S. Army's Future Combat System, as the theoretical underpinnings of its birth evolved from the doctrinal interaction of two Cold War armies (Soviet and American) desperately attempting to rescue conventional operations from the menacing nuclear cloud that loomed overhead.¹¹⁷ The Soviets believed that precision conventional weapons would eventually render nuclear weapons obsolete. The United States learned of this idea by examining Soviet military journals,

¹¹⁵ Department of the Army. *FM 3-21.75 The Warrior Ethos and Soldier Combat Skills*. (Washington, D.C.: Government Printing Office, 2008), 13-20.

¹¹⁶ *Ibid.*, 15-1.

¹¹⁷ Andrew Bacevich, *The Pentomic Era: The U.S. Army Between Korea and Vietnam*. (Washington, D.C.: National Defense University, 1986). The U.S. Army started thinking about how to fight on a nuclear battlefield with its ill-fated Pentomic Divisions during the 1950s.

and decided to adopt it.¹¹⁸ Today, the idea of precision is marketed for “irregular challenges.” The origin of the idea is suggestive of an institutional conservatism that is likely to hinder transformation. The fact that type of challenge is deemed “irregular” illustrates the idea that the U.S. Army has a cultural preference for whatever it deems as “regular,” and that traditional form of warfare requires significant investment in a brigade structure centered around tanks, supported by infantry and artillery.

¹¹⁸ Andrew Marshall. In “The Military-Technical Revolution.” by Andrew Krepinevich. (Washington, D.C.: Center for Strategic and Budgetary Assessments, 2002); Andrew Marshall says, “During the mid to late-1970s my office had picked up on the writings and other actions by the Soviet military which suggested that they believed a period of major change in warfare had begun. At that time it was the United States that was laying the groundwork for the revolution, but it was the Soviet military theorists, rather than our own, that were intellectualizing about it, and speculating on the longer-term consequences of the technical and other changes that the American military had initiated.” Foreword, ii.

III. “BREAKING STARCH”: THE RESILIENCE OF TRADITION

The United States Army has undergone three major uniform changes since the end of World War II. An Army Chief of Staff initiated each uniform change during a period of reform in doctrine, organization, and equipment acquisition. These uniform changes consist of the all-green uniform in 1954, the Battle Dress Uniform (BDU) in 1981, and the Army Combat Uniform (ACU) in 2004. The all-green uniform heralded the Pentomic Era, where the Army attempted to utilize nuclear weapons throughout its doctrine and organization. The BDU heralded AirLand Battle doctrine and the acquisition of the “Big Five” weapon systems. The black beret and ACU are the first expressions of current Army transformation and its associated Future Combat System (FCS). This chapter frames the new ACU in a historical context in order to assess the impact of military traditions during a period of Army reform, and to highlight the connections between the design of the new uniform and the design of the FCS.

In his autobiography, former Chairman of the Joint Chiefs of Staff Colin Powell expressed frustration over the practice of “breaking starch,” whereby uniform pants were starched so heavily that the legs had to be broken open with a “broom handle” in order to wear the pants.¹¹⁹ Powell was disturbed by the fact that soldiers were spending too much time and money ironing and starching their uniforms for “readiness” inspections rather than training for actual combat readiness.¹²⁰ He first used the term “breaking starch” while serving as a Lieutenant in Korea in 1961. Powell believed that starching was an example of a “foolish tradition.”¹²¹ While writing about experiences in positions of greater responsibility, Powell continued to use the phrase “breaking starch” in a metaphorical manner when frustrated by senseless bureaucratic practices.

The Army’s focus on uniform appearance originated from 17th Century Europe, during a time when the “readiness” of an army was evident as part of its appearance.

¹¹⁹ Colin Powell. *My American Journey*. (New York: Ballantine Books, 1995), 55.

¹²⁰ Ibid.

¹²¹ Ibid.

During this time, uniform appearance was an expression of the moral unity of combatants as well as their national identity. Uniform appearance was significant because according to Paul Fussell, “soldiers needed to be seen in all their threatening glory to demoralize their enemy a short distance away.”¹²² Today, the connection between massed uniform appearance and potential in warfare is irrelevant, as it is possible for armies to fight effectively without standing in close formation wearing colorful uniforms. Uniform changes, however, continue to be an integral element of current Army transformation. The Army plans on equipping fifteen modular brigades with the Future Combat System by 2030, in an effort to modernize equipment and undergo “transformation.” Despite this grandiose vision, so far, the black beret and ACU is the only new equipment available to soldiers.

Military attire and acquisitions both reveal certain underlying conservative characteristics within the United States Army as an institution that is struggling to find a way to simultaneously deal with two significant aspects of warfare: the advent of modern indirect fire weapon systems, and the challenge posed by guerilla tactics. The foreword of the Army's latest *Counterinsurgency* manual points out the long span in time since the last publication of a manual devoted to this type of warfare:

It has been 20 years since the Army published a field manual devoted exclusively to counterinsurgency operations. For the Marine Corps it has been 25 years. With our Soldiers and Marines fighting insurgents in Afghanistan and Iraq, it is essential that we give them a manual that provides principles and guidelines for counterinsurgency operations. Such guidance must be grounded in historical studies. However, it also must be informed by contemporary experiences.¹²³

Having a new manual does not necessarily mean that the Army will fully take on this type of mission. The impact of the publication must be analyzed in the context of other manuals released during the same period. The frequency that various manuals are updated reveals the true focus of the institution. For example, the latest version Army's

¹²² Paul Fussell, *Uniforms: Why We Are What We Wear*. (Boston: Houghton Mifflin, 2002).

¹²³ FM 3-24 *Counterinsurgency*, foreword.

publication, *Wear and Appearance of Army Uniforms and Insignia*, was released during the same year as the *Counterinsurgency* manual, but it is updated more frequently.¹²⁴

The *Army Times* frequently features front-page headlines on recent changes regarding uniforms and the appropriate wear of various badges, as well as numerous posts from readers that are concerned with some aspect of this subject. Long before the French Army marched into battle at the outset of World War I wearing fashionable red pants, military institutions have been obsessed with their appearance, sometimes more so than with the actual conduct of war. Even Homer devoted 140 lines in the *Iliad* to describe the armor that Hephaistos forged for Achilles.¹²⁵ The description of the armor served to illustrate certain social beliefs about war rather than the actual functionality of the armor in combat.¹²⁶ Likewise, what soldiers wear into battle reveals certain institutional beliefs in the U.S. Army today.

The acquisitions process for military equipment has grown far more complex than during the time of Homer, but it is nonetheless still an area that is interconnected with appearance and morality. The awards and badges worn today represent an acknowledgement of the moral burdens shared and endured by those who fight, while the design of equipment represents a different type of burden. In Homer's time, the equipment and uniform were one in the same, but today the separation is apparent by what is worn in garrison and combat. The machinery of war has grown far beyond what is worn or carried by troops. The design of equipment used in combat, however, is still an extension of the moral burden of combat to those removed from physical danger. This moral connection has inspired much controversy, and is even linked to the post-traumatic stress disorder of some Vietnam veterans who believe that the nation sent them to war with inadequate equipment.¹²⁷

¹²⁴ AR 670-1 *Wear and Appearance of Army Uniforms and Insignia* is sometimes updated several times per year. It is 362 pages long, compared to the 242-page manual on counterinsurgency.

¹²⁵ Robert O'Connell. *Of Arms and Men*. (New York: Oxford University Press, 1989), 48.

¹²⁶ Stephen Scully. "Reading the Shield of Achilles: Terror, Anger, Delight." *Harvard Studies in Classical Philology* 101 (2003), 29-47.

¹²⁷ Jonathan Shay. *Achilles in Vietnam: Combat Trauma and the Undoing of Character*. (New York: Simon and Schuster, 1994), 18.

A. MILITARY REFORM AND NEW UNIFORMS

The most significant change in modern military uniforms is the advent of camouflage during World War I. Soldiers began to wear camouflage during this war, and it was used to conceal artillery pieces from aerial observation. The advent of modern direct and indirect fire systems caused militaries to adopt camouflage in an attempt to conceal troops and critical equipment from being targeted by the devastating effects of firepower.¹²⁸ Despite the enormous incentive to remain invisible to the enemy, however, militaries still find themselves getting caught up in the traditional details of how to wear numerous colorful and shiny items.

Napoleon observed that "a soldier will fight long and hard for a bit of colored ribbon."¹²⁹ He instinctively understood how to appeal to the frailty (or power, depending on how you view it) of the human ego, having quite a large ego himself.¹³⁰ The display and allure of colorful items resembles more so the manner in which male peacocks use their colorful feathers to attract mates rather than anything of tactical significance in modern warfare. It is no coincidence that the motivations of war and mating, which in turn relate to destruction and creation, have similar dynamics.¹³¹ The pursuit of a fast climax with minimal effort in either endeavor is likely to produce an unsatisfactory outcome. Clausewitz observed, "War does not consist of a single short blow," as a response to such ideas prevalent among militaries of his time, as expressed by Jomini. Despite this, the Jominian idea that a rapid climactic battle at some decisive point can determine the outcome of a war remains more influential for the US Army, even as it is engaged in a "Long War."¹³² In fact, the George W. Bush administration's decision to

¹²⁸ Roy Behrens. "Art and Camouflage: An Annotated Bibliography." *Leonardo Online*. At: <http://www.leonardo.info/isast/spec.projects/camouflagebib.html>.

¹²⁹ "Napoleon Bonaparte Quotes." At: <http://www.brainyquote.com/quotes/quotes/n/napoleonbo108401.html>. Accessed on 25 Feb 08.

¹³⁰ Ibid. This evident by his saying that "glory is fleeting, but obscurity is forever."

¹³¹ In an abstract manner, Shakespeare observes the similar dynamics of such opposites in a series of oxymoron in *Romeo and Juliet*. Likewise, in a more primal manner, in *The Stuff of Thought: Language as a Window into Human Nature*, Stephen Pinker, observes similarities in the usage and origins of the words "fuck" and "stab."

¹³² Jim Garamone, "Military Culture Must Change to Fight 'Long War.'" *American Forces Press Service*. (23 January 2006). At: <http://www.defenselink.mil/news/newsarticle.aspx?id=14551>.

refer to the “War on Terror” as the “Long War” was a calculated attempt to alter a military culture conditioned by the idea of a short decisive war.¹³³

Ninety-three years ago, French infantrymen marched off to war wearing red pants and believing that the psychological shock effect of the color red, combined with the "sense of oneness" that it gave units, would lead to a quick victory.¹³⁴ At the time, the French Army believed that "camouflaged material would actually sabotage national security."¹³⁵ The red pants, however, only served to conceal the blood that was shed in part because an institution clung to its belief that battles were won by an offensive spirit, despite the advent of machine guns and long range predicted artillery fire. For the U.S. Army today, the old French idea that red pants might “shock and awe” an opponent has been substituted with similar beliefs about the digitally networked application of precision firepower, as evident with the current transformation effort. Red pants were a manifestation of beliefs about offensive spirit, and the color persists in military uniforms today.

Soldiers in the 1st Infantry Division of the U.S. Army proudly display the "Big Red One" patch in actual red, as opposed to the subdued black colored patches that most units wear.¹³⁶ The unused subdued color patches overflow the stocks of military clothing stores in Wurzburg, Germany and Fort Riley, Kansas, and are only occasionally purchased by the new private or lieutenant who knows nothing yet of the traditions of war, arriving to their units wearing a patch that is not red, rationally assuming that such a color is no longer worn in combat. The "sense of oneness" that officers believed red pants gave the French Army is no different than the sense of oneness that United States Army officers hope to instill by wearing the "Big Red One" patch on their shoulder, as evident in the below photograph of General John Batiste in Iraq, who was the commander of the 1st Infantry Division at the time.

¹³³ Garamone, “Military Culture Must Change,” 1.

¹³⁴ Edward Katzenbach. "The Horse Cavalry in the Twentieth Century: A Study in Policy Response." *Public Policy*. (1958), 127.

¹³⁵ Ibid.

¹³⁶ Doctrine calls for wearing the subdued color. See: *Wear and Appearance of Army Uniforms and Insignia*.



Interestingly, the officer in the newly formed Iraqi Army (on the left) is also wearing red, on his uniform epaulettes, and a red beret, which was originates as a form of military headgear first worn by French mountain troops in the 1880s.¹³⁷ While the color red may be representative of revolutionary zeal in the political sphere, it is representative of institutional conservatism in the military sphere. Red is worn in proud defiance of institutional attempts to conceal personnel with camouflage.

The first outward sign of change in a military institution is evident with the introduction of new apparel. Whether or not the U.S. Army is successful in shifting the bulk of its capabilities from "traditional" to "irregular" forms of conflict as per the latest guidance from the *National Security Strategy* and *Quadrennial Defense Review*, the one certainty is that the institution will find some manner of addressing this shift with new military attire. The introduction of the black beret for the entire Army in 2001 was meant

¹³⁷ From official website of [13^{ème} Bataillon de Chasseurs Alpains](http://www.bca13.terre.defense.gouv.fr/). At: <http://www.bca13.terre.defense.gouv.fr/>. Accessed on 25 Feb 08.

to emphasize a new expeditionary focus for the institution, despite the fact that it is unlikely (and unnecessary) for any rapid deployment unit to wear its berets in combat.¹³⁸ The story of how the Army was able to acquire enough berets for every soldier by June 14, 2001 reveals the complexity of the acquisitions process.¹³⁹ The acquisition of the beret inspired a Government Accountability Office (GAO) report and numerous Congressional testimonies, since many berets were manufactured in China, and 75th Ranger Regiment had to pick a new color beret to wear.¹⁴⁰

The introduction of the black beret by General Erik Shinseki in 2001 was “strikingly similar” in spirit to the introduction of the green uniform by General Maxwell Taylor in 1954.¹⁴¹ The introduction of the green uniform served as the first expression of reform for the Army after the Korean War. The new uniform heralded an era where the Army relied heavily on nuclear weapons, developing doctrine that called for the distribution of “tactical” nuclear weapons with a two-kilometer range down to the team level.¹⁴² As seen from the perspective of budgetary politics, the new uniform and reliance on nuclear weapons was an attempt to mimic the techniques of the Air Force, which had successfully secured a larger share of the defense budget.¹⁴³

In an article in a professional journal in 1955, an Army officer jokingly suggested that the Army should be absorbed into the Air Force to save money, reduce rivalry, and

¹³⁸ As a part of Army-wide transformation, the beret is suggestive of how aircraft may transport mechanized forces. Personnel in airborne units such as the 82nd Airborne Division, 75th Ranger Regiment, and Special Forces Groups typically wear berets.

¹³⁹ This date was intended for an elaborate celebration of the Army’s Birthday at the Pentagon, upon which Army personnel working in the building would take off the old headgear and put on the new, somehow being symbolically “transformed” the process. In reality, it caused the Army people that worked in the building to waste numerous hours shaving the berets in their offices (rather than making PowerPoint slides) the week prior to the event, so they fit with a ‘regulation’ appearance on the special day.

¹⁴⁰ The Department of Defense allowed the Defense Logistics Agency to purchase berets from China in order to speed the fielding process, in violation of the Berry Amendment. See: Valerie Grasso. “The Berry Amendment: Requiring Defense Procurement to Come from Domestic Sources.” (April 2005) *Congressional Research Service*, At: <http://www.fas.org/sgp/crs/natsec/RL31236.pdf>, 2.

¹⁴¹ Arthur Connor. “The Army and Transformation, 1945-1991, Implications for Today.” (Carlisle Barracks, PA: United States Army War College, 2002), 22.

¹⁴² The Davy Crockett fired a nuclear warhead at this range, and could be distributed down to the team level. See: Andrew Bacevich. *The Pentomic Era*. (Washington, D.C.: National Defense University Press, 1986), cover of book.

¹⁴³ Bacevich, *The Pentomic Era*, 17; The Air Force budget grew to become twice and large as the Army budget.

boost morale by putting soldiers “in a snazzy blue uniform.”¹⁴⁴ The motivation for having new uniforms during this period was partially due to dissatisfaction with the color of the existing uniform. An official Army study stated, “Because the color was a camouflage shade, not normally worn in men's clothing, the uniform was almost instinctively rejected.”¹⁴⁵ The study also stated “the olive-drab color lacked consumer acceptability and that the Army should find a more attractive color if it wished to obtain a satisfactory uniform upon which a tradition could be built.”¹⁴⁶ To determine the appropriate color of the uniform, wives, veterans, and active duty soldiers were surveyed on whether they preferred various shades of colors such as gray, blue, green, taupe, or even pink.¹⁴⁷ This effort was mostly an attempt to “distinguish” and compete with the colors used by the Air Force rather than to develop a functional uniform for combat.¹⁴⁸ The Army’s uniform change in 1954 was illustrative of a budget competition with the Air Force that echoes today with the Future Combat System.

After Operation Desert Storm in 1991, proponents of air power argued that the Army faced such minimal resistance during the war because the bombing campaign already destroyed the Iraqi Army.¹⁴⁹ In 1999, Operation Allied Force in Kosovo demonstrated the Air Force’s new precision weapons without the presence of significant NATO ground forces. Slobodan Milosevic agreed to a peace settlement after 78 days of bombing; thus appearing that air power alone had achieved victory.¹⁵⁰ After the Kosovo conflict, the Army Chief of Staff would once again make uniform changes and adopt the

¹⁴⁴ Bacevich, 21.

¹⁴⁵ Stephen Kennedy and Alice Park. “The Army Green Uniform.” (Natick, MA: U.S Army Clothing and Organic Materials Laboratory, 1968), 3.

¹⁴⁶ Ibid.

¹⁴⁷ Ibid., 1.

¹⁴⁸ Ibid., 4. The Army intended to develop a new uniform that was not blue (like the Air Force), but equally as appealing.

¹⁴⁹ Robert Pape, *Bombing to Win*. (Ithica and London: Cornell University Press, 1996), 212.

¹⁵⁰ Anthony Hinen. “War Can Be Won With Air Power Alone!” *Air and Space Power Journal*. (16 May 2002), 1 (see title).

form of firepower gaining prominence in the Air Force, inspired by similar budgetary dynamics and fears of institutional irrelevance that were prevalent in the Army during the 1950s.

B. STARCHING CAMOUFLAGE: THE RESTORATION OF TRADITION DURING REFORM

The move from the all-green uniform to the camouflage Battle Dress Uniform (BDU) in 1981 heralded the introduction of highly acclaimed Air Land Battle doctrine one year later.¹⁵¹ The introduction of the BDU was an attempt to bleed out the manner in which traditional military culture continued to infect the Army. The label on the uniform plainly stated, “Do not starch.”¹⁵² Experiments and studies determined that the heavy starch soldiers applied to their uniforms appeared as a white glow when viewed through night vision devices, even after numerous washings.¹⁵³ The special dyes in the BDU were used to limit the visibility of the material in the infrared (IR) spectrum (the T-72 Soviet tank used an IR sight), and these were rendered ineffective by starch.¹⁵⁴ Starched uniforms also enhanced the potential for detection using thermal imaging systems (such as the one in the T-80 Soviet tank) due to increased heat retention.¹⁵⁵ Additionally, the practice of starching wasted troops’ free time and meager salary.

The new uniform coincided with growing concern that the Soviet Army would use the cover of darkness commence an attack through the Fulda Gap in a thrust toward the English Channel. At the time, the Soviet Union led the way in the development of night vision equipment and had a history of initiating major operations at night, combined

¹⁵¹ It also emerged during the same year as the comedy *Stripes*, starring Bill Murray, where soldiers wore the all green uniform. The film depicted the Army as an unsuccessful institution that recruited those who were unsuccessful in civilian society. The new uniform was an attempt to change the Army’s image. Interestingly, the movie depicted an experimental new weapon system that looked like a recreational vehicle, but had capabilities similar to FCS vehicles.

¹⁵² See label on the uniform.

¹⁵³ FM 20-3 *Camouflage, Concealment, and Decoys* (30 August 1999) Washington, DC: Headquarters, Department of the Army. 76.

¹⁵⁴ Ibid.

¹⁵⁵ Ibid.

with doctrine that called for night offensives.¹⁵⁶ U.S. Army initiatives to “own the night” during the 1980s were inspired by these concerns.¹⁵⁷ Although most of the initiatives were successful, attempts to end the tradition of starching uniforms were largely unsuccessful, particularly in the infantry. Even the Ranger Creed states the importance of “neatness of dress,” and many Rangers continued to interpret this as having BDUs with the most starch. In 2003, the Army finally yielded to the influence of its traditional culture with a compromise whereby doctrine stated:

Although some uniform items are made of wash-and-wear materials or are treated with a permanent-press finish, soldiers may need to press these items to maintain a neat, military appearance. However, before pressing uniform items, soldiers should read and comply with care instruction labels attached to the items. Soldiers may starch BDUs and the maternity work uniform, at their option. Commanders will not require soldiers to starch these uniforms, and soldiers will not receive an increase in their clothing replacement allowance to compensate for potential premature wear that may be caused by starching uniforms.¹⁵⁸

The Army entered Baghdad five months before the publication of this statement. Around this time, it became clear to many in the institution that such concerns were irrelevant in all modern warfare, whether traditional or irregular.

C. “BREAKING STARCH”: THE ARMY COMBAT UNIFORM (ACU)

The ACU was introduced on June 14, 2004, the Army’s Birthday. Like the all-green uniform, BDU, and black beret that came before it, the new uniform was intended as departure from tradition, and a step forward to the future of warfare. The new uniform was accompanied by a stern directive stating: “Soldiers will not starch the Army Combat

¹⁵⁶ Claude R. Sasso. “Soviet Night Operations in World War II.” *Combat Studies Institute*. (December 1982). Fort Leavenworth, KS. At: <http://www-cgsc.army.mil/carl/resources/csi/Sasso/SASSO.asp>. Accessed on 25 Feb 08.

¹⁵⁷ Night Vision and Electronic Sensors Directorate. “Early Attempts at Night Vision Technology.” United States Army Research, Development, and Engineering Command. At: <http://www.nvl.army.mil/about/index.php>. Also, the invasion of Iraq was initiated at night.

¹⁵⁸ FM 7-21.13 “Duties, Responsibilities, and Authority of the Soldier.” *The Soldier’s Guide*. (Washington, DC: Department of the Army, 15 October 2003), chapter 3, paragraph 92.

Uniform under any circumstances.”¹⁵⁹ This directive was worded stronger than the instructions associated with the BDU in 1981, and accompanied by an aggressive internal information campaign. Sergeant Major of the Army Kenneth Preston issued the following statement to all noncommissioned officers (NCOs) in the Army:

If we as NCOs enforce the standards and intent of the regulation, the savings gained by not sewing on patches or laundering at dry-cleaners should more than make up for the purchase and replacement costs. I look to you to help our Soldiers embrace this Warrior focus, while maintaining the clean appearance our Army is renowned for.¹⁶⁰

This quotation was on PowerPoint slides in briefings given by NCOs throughout the Army. The intent of the regulation mentioned by SMA Preston was not to starch the uniform, and to utilize the new Velcro patches instead of sewing on patches. His challenge to find ways to maintain the renowned “clean appearance” without starch was met with much creativity.¹⁶¹ Numerous internet forums with posts written by soldiers illustrate ways of stiffening the ACU without starch, such as by putting it under a mattress and sleeping on top of it, whereby the Army was literally resting upon tradition while facing the future of warfare.¹⁶² The fact that some soldiers go to this extreme does not imply that they believe it is necessary, lack intelligence, or cling to tradition, but rather, as in all else they do (such as risking their lives), it is expected by the institution. Soldiers can earn promotion points based on maintaining a certain appearance, so that they can one day rise toward the top of the institution and preserve such “foolish traditions,” while weeding out those who do not comply.¹⁶³ For soldiers who spend weeks on combat patrols, the psychological effect of seeing uniforms with a “clean

¹⁵⁹ Department of the Army G1 Office Memorandum. “Army Combat Uniform.” At: [http://www.armyg1.army.mil/HR/uniform/docs/Army%20Combat%20Uniform%20\(ACU\)%20Ensemble.pdf](http://www.armyg1.army.mil/HR/uniform/docs/Army%20Combat%20Uniform%20(ACU)%20Ensemble.pdf). Accessed on 15 Feb 08.

¹⁶⁰ Kenneth Preston. “Army Combat Uniform Briefing.” Slide 4.

¹⁶¹ This may have been an unintentional challenge. His use of the word “clean” may have been interpreted in traditional terms to mean “stiff.”

¹⁶² “How to Really Square Away Your ACUs?” At: <http://forums.military.com/eve/forums/a/tpc/f/56819558/m/4010023251001>. Accessed on 10 Dec 07,

¹⁶³ When a former Chairman of the JCS refers to something as a “foolish tradition,” and the tradition continues, this illustrates the power of institutional culture and conservatism in the military.

appearance” worn by others who remain inside Forward Operating Bases will likely be associated with the post-traumatic stress disorder in future generations of soldiers.

The direction of Army transformation is evident with the new Army Combat Uniform. The digitized camouflage pattern alludes to the role that the digitization of various weapon systems might play in the future conduct of war. In contrast to having a different camouflage pattern for different environments, the new digitized pattern is meant for all environments. This is reflective of the Army’s belief that its new weapon systems are also suitable for all combat environments, and can attain “full-spectrum dominance.”¹⁶⁴ By designing a camouflage pattern intended for all environments, the Army created a uniform not optimized for specific environments.¹⁶⁵ Furthermore, the Velcro on the pockets draws an unnecessary amount of attention when one is trying to remain hidden while opening a pocket to pull out one of the new digital devices that controls the FCS.¹⁶⁶ The Marine Corps, often considered a highly adaptable military institution, has a different approach to its combat uniforms. The new Marine Corps Combat Utility Uniform (MCCUU) uses a hybrid design whereby pockets that can be accessed while wearing body armor use old-fashioned buttons which do not make noise, while all other pockets that are only accessible without body armor (in a garrison environment) use Velcro. The new Marine uniform does not rely on a single color scheme, and instead uses separate woodland and desert patterns for different environments. This exhibits a willingness to use different equipment in different environments that is lacking in the Army.

The pants worn by troops reveal far more about the beliefs of a military institution than one might expect. Pants also reveal the nature of the tasks that troops must perform.

¹⁶⁴ “Future Combat Systems Phase 1.” At: <http://www.globalsecurity.org/military/systems/ground/fcs-1.htm>. Accessed on 10 Dec 07.

¹⁶⁵ The new ACU pattern is optimal only in an urban environment. This may be an accurate prediction on where troops are most likely to operate in the future. The fact that the pattern is not optimal in an area of heavy vegetation (Vietnam) reveals an institutional attempt to reject the possibility of fighting in such an environment.

¹⁶⁶ In response to this concern, the Army’s Program Executive Office Soldier stated, “It was determined that the issue of noise associated with the hook and pile fastener in a tactical environment could be overcome with familiarity and use during training (noise and light discipline) much like what Soldiers currently do when employing other weapons and individual equipment items in a tactical environment.” At: <http://peosoldier.army.mil/faqs.asp#Q64>. Accessed on 10 Dec 07.

A recent acquisition controversy revealed that the new ACU pants have poor stitching in the “crotch” area and frequently rip open.¹⁶⁷ While this may be due to a correctable manufacturing problem, it is also reflective of the fact that troops in a modern mechanized army are actually spending more time on their feet rather than in their vehicles. This is because it is difficult to build democracies and achieve the political ends of irregular warfare while sitting inside of armored vehicles and fortified compounds.¹⁶⁸

Despite the shortcomings of the new ACU, it may have eliminated the use of starch. Most Army officers are unaware of the fact that this measure was originally inspired when contemplating how to deal with the Soviet Army, rather than how to conduct irregular warfare.¹⁶⁹ “Owning the night” may have offered an advantage when defending the Fulda Gap from a major Soviet offensive initiated at night, but it offers little improvement in capability when fighting against an opponent that prefers to sleep at night. Insurgents in heavily populated urban areas wisely choose not to operate during the still of night, where curfews are strictly enforced, and any activity is quickly spotted by patrols and observation posts using the latest night-vision technologies. Instead, the enemy remains elusive by blending into daytime rush hour traffic and busy marketplaces. This form of camouflage drastically outperforms the new ACU, and poses a tactical problem characteristic of irregular warfare. In this case, the difference in what is worn by opposing forces highlights the central difference between irregular and traditional warfare. Modern military uniforms simultaneously serve two contradictory purposes: the purpose of identification, which originated in the 17th Century; and the purpose of concealment, which originated in the 20th Century. In the 21st Century, identification serves a political purpose while concealment serves a tactical purpose. Irregular warfare occurs when at least one party in a violent struggle chooses to serve both purposes

¹⁶⁷ Tom Vanden Brook. “Army Fixing Uniforms Prone to Rips: Soldiers Report Problem with Crotch Durability.” *USA Today*. (27 November 2007), 1.

¹⁶⁸ This is not necessarily meant to imply that getting out of the vehicles and compounds would foster much better results. Armor is still necessary, but not for the traditional doctrinal purpose of “shock effect” or “closing with and destroying the enemy.” Instead it may be necessary to support dismounted infantry in urban areas, though it was not designed for this environment.

¹⁶⁹ Likewise, critics of FCS argue that the entire program is driven by obsolete Cold War requirements.

without a uniform. Failure in the conduct of irregular warfare is certain for the side that does not understand this possibility, or considers it a “lousy” way of conducting war.

The minor success in equipment procurement and doctrine evident with the new ACU is overshadowed by the fact that a new uniform and aggressive internal information campaign was necessary to subvert the Army’s traditional focus on its appearance. This pattern continues with the new boot associated with the ACU. The tan desert boot worn with the new ACU was purposely chosen because its rough leather cannot be shined. As a result, the Sarah Lee Corporation, owner of Kiwi shoe polish, decided to market shoe inserts and fresheners instead of polish in order to maintain profits.¹⁷⁰ Fortunately, the Army has discovered that shoe polish does not win wars. However, it must realistically assess its assumptions involving larger decisions, such as the \$200 billion Future Combat System. The new modular boot design is based on the same idea as the new modular FCS brigade design, as both are intended to operate in any environment. However, designing a lightweight boot that is ideal from -20 degrees to 130 degrees stretches the limits of physics.¹⁷¹ Similarly, the notion that one type of brigade structure can be ideal for both traditional and irregular warfare also stretches the limits of physics. The characteristics of the new ACU and Modular Boot System reverberate throughout the Army’s modernization program, revealing the institution’s approach to “full-spectrum dominance.”

¹⁷⁰ Julie Jargon. “Kiwi Goes Beyond Shine in Effort to Step up Sales.” *The Wall Street Journal*. (20 December 2007), 1; This implication is minor for a company that also makes cakes, but for companies that manufacture armored vehicles, the implications of Army modernization are much larger.

¹⁷¹ Matthew Cox. “A Boot for all Seasons.” *Army Times*. (10 December 2007), 8.

IV. FUTURE COMBAT SYSTEM

This chapter assesses the two major design characteristics of the Future Combat System (FCS), air-mechanization and networked sensors.¹⁷² Manned ground vehicles (MGVs) in the FCS will weigh significantly less than current vehicles such as the 70-ton Abrams tank and 35-ton Bradley IFV (Infantry Fighting Vehicle). The reduction in weight is intended to accommodate rapid deployment with aircraft. This concept is known as air-mechanization (Air-Mech). Because the MGVs will have less physical armor than current vehicles, they will rely on a network of long-range sensors in order to maneuver outside of the range of enemy weapon systems, allowing the FCS to “see first and shoot first.”

The most criticized aspect of the FCS is the reduction of physical armor on eight new manned vehicles. These vehicles will rely on active protection systems rather than physical armor. Active protection systems will detect and intercept incoming kinetic energy projectiles fired from enemy tanks.¹⁷³ These proposed vehicles and units would arguably be more effective than current forces in future conflict because they can deploy faster (due to less weight), and are capable of long-range precision firepower as a result of advances in information technology. Nevertheless, these advantages, while real, also reflect a characteristic, long-standing emphasis upon scenarios involving only the initial outbreak of war, the role of mechanization, and the range of weapon systems. This may be indicative of a reluctance to let go of traditional preoccupations that emerged during the Cold War in light of new and emerging threats.

The air-mechanization capacity of the FCS can be measured in terms of vehicle tonnage, deployment distance, and the number of sorties required for transport. These technical considerations correspond to political objectives that may call for rapid

¹⁷² The Army-wide adoption of the black beret alludes to the idea of air-mechanization, while the digitized ACU pattern illustrates the pursuit of digitization, or networked sensors.

¹⁷³ Robin Hughes. “Israel Armor Protection System ‘Revolutionary’.” *Jane’s Defense Weekly*. (16 March 2005); This is similar to the Israeli Trophy Active Protection System which was developed for the Merkava tank and armored personnel carriers. The U.S. Army briefly considered purchasing this system for the FCS, but instead decided to develop a more advanced system. Regardless, such systems hinder the ability for foot soldiers to operate near a vehicle, as they may be inadvertently killed when the system engages an incoming round.

deployment of the U.S. Army. Air-mechanization may be required in situations involving imminent threat, lack of allied support for a deployment, or geographic constraints (such as lack of seaports). The only historical cases where the Air-Mech concept was used to conduct an attack are: Operation Jonathan, conducted by Israel in Uganda (1976), and Operation Airborne Dragon, conducted by the United States in northern Iraq (2003).¹⁷⁴ These two cases reveal the possibilities and limitations of the air-mechanization concept in a hostile environment. The time necessary for deployment of certain sized-forces to various locations is based on technical factors that can be calculated with near-absolute certainty.¹⁷⁵ The strategic dynamics of rapid deployment depends on the nature of the political objective, and can be inferred from the historical cases.

The System of Systems Common Operating Environment (SOSCOE) is intended to link the sensors of the FCS via a secure wireless network connecting mechanized forces while simultaneously on the move.¹⁷⁶ This will allow the FCS to engage enemy forces beyond the range of physical or visual (human eye) contact. The potential of networked sensors is a matter of bandwidth (network throughput) and software development for the human interface between sensor data and weapon systems.¹⁷⁷ Operation Allied Force in Kosovo best illustrates the potential and limitations of networked sensors in conventional operations. Ironically, the Army's ground-based

¹⁷⁴ The Army's deployment of Task Force Hawk during Operation Allied Force in Kosovo was also a case of air-mechanization, but most of the force was never used. This deployment utilized aircraft and included a company of tanks, but the tanks were not intended for an offensive role. The deployment of attack helicopters, though intended for an offensive role, were never used, as they were vulnerable to attack.

¹⁷⁵ Only the time requirement can be calculated with certainty. This does not imply successful deployment is guaranteed by the calculations, as this is a factor of suppression or destruction of potential enemy air defenses and fighter intercept aircraft, as it is always possible to shoot down cargo aircraft before they land. The time requirement can be calculated with near-certainty, but whether or not the requirement can be achieved is another matter.

¹⁷⁶ Paul Schoen. (SOSCOE Director) "System of Systems Common Operating Environment." Briefing Slides. FCS Lead Systems Integrator, Boeing (15 September 2006), At: http://www.afci.org/brochure/6a04/documents/PaulSchoen_PublicReleaseshort.pdf. The purpose of the SOSCOE is to link vehicle platforms in a net-centric configuration. Slide No. 4.

¹⁷⁷ FCS network software is also intended to reduce bandwidth by allowing sensors to process information prior to transmission based on certain predetermined adjustable criteria. Software will filter the transmission of high-bandwidth data, such as video feeds from unmanned systems, to prevent the network from being flooded with useless information.

sensors inadvertently played a decisive role in the conflict. Task Force Hawk deployed to Kosovo in 1999, consisting of Apache attack helicopters, based on the assumption that helicopters could provide the decisive blow against Serbian ground forces that the U.S. Air Force could not deliver. This did not occur. Instead, radar systems assigned to artillery units supporting the Apaches inadvertently provided critical targeting data to the Air Force.¹⁷⁸ The capabilities of the Army's Firefinder series counterbattery radar systems, evident in combat scenarios, provide an example of what can be accomplished by a networked system of sensors. The belated adaptation of these systems for current use in Afghanistan and Iraq suggests that Army planners were unaware of the role played by these sensors the past. Although counterbattery radars are only one type of sensor, their real-time linkage of sensors-to-shooters via a network closely resembles capabilities envisioned by the FCS and SOSCOE, while having a historical basis for analysis. Ultimately, warfare is not simply a matter finding and destroying targets. The FCS network's capacity for collection, management, and sharing of data will facilitate logistical functions, and may assist in compiling information necessary to conduct police functions, such as control of populations.

A. AIR MECHANIZATION (AIR-MECH) CONCEPT

The Future Combat System's eight manned vehicles are based on a common chassis to decrease logistical requirements and replace aging vehicles such as the Abrams, Bradley, and Paladin. The following table shows the original vehicle design requirements developed in 1999:

¹⁷⁸ Data that could not be obtained with the Joint Surveillance Target Attack Radar System (JSTARS).

Future Combat Systems Requirements

Mobility and Deployability

Weight: less than 18 tons
Fuel efficiency: greater than 3 miles per gallon
Burst speed: 100 kilometers per hour
Cross-country speed: 60 kilometers per hour

Survivability

Frontal 60 degree arc:
 Single kinetic energy round from T/80–T/72
 Multiple rounds from 20–25-mm chaingun
Hemispherical:
 50-caliber machinegun
 2–3 antitank guided missiles
 rocket-propelled grenades
Antitank mines

Lethality

Conventional targets:
 T72 and T80 main battle tank
 Bunkers and hardened buildings (for example, military command posts)
Post-Cold War Requirements:
 Precision strike
 Low collateral damage
 Specific individuals and groups

Situation Awareness (goals in open terrain)

90 percent of all tanks, armored fighting vehicles, and artillery positions
 known and updated every 10–30 minutes
70 percent of enemy infantry positions known and updated every 5–10 minutes
90 percent of blue force infantry positions known
95 percent of noncombatants identified
 Potential Combatants also identified

Table 1: Original FCS Requirements (From Defense Horizons)

Today, most of the original design goals remain the same, with the exception of the 18-ton minimum weight requirement. The original requirement was based on the ability to transport one vehicle on a C-130 Hercules, since this aircraft can land on unimproved dirt or grass surfaces. In 2004, Secretary of the Army Francis Harvey stated that an “evolution in thinking” caused the Army to set a “real requirement,” of less than 24 tons, with three vehicles fitting on a C-17 Globemaster.¹⁷⁹ In 2007, the minimum weight requirement increased to 27 tons, with three vehicles fitting on a C-17, and disassembled components trailing behind on two C-130s.¹⁸⁰ Additionally, the Army

¹⁷⁹ Greg Grant. “U.S. Army Drops C-130 Requirement for FCS.” *Defense News*. (September 2005). At: <http://www.defensenews.com/story.php?F=1129661&C=america>. Accessed on 15 Feb 08.

¹⁸⁰ Kris Osborne. “Iraq War Drove Weight of FCS Vehicles.” *Defense News*. (April 2007). Available: <http://www.defensenews.com/story.php?F=2672608>. Accessed on 15 Feb 08.

suggested it may develop a quad tilt rotor transport aircraft.¹⁸¹ This specific proposal is a direct result of the 1948 Key West Agreement, which served as a bureaucratic peace treaty regarding the proper roles of the Army, Navy, and Air Force. Part of this agreement allows the Army to develop helicopters, but sets a 5,000-pound upper weight limit on the development of fixed wing aircraft.¹⁸² Tilt rotor aircraft designs purposely blur the distinction between what constitutes a helicopter and fixed wing aircraft. The tilt rotor design has more to do with inter-service politics than with aeronautical engineering, as the Army believes the Air Force should develop more cargo aircraft.¹⁸³

FCS vehicle specifications are based on former Army Chief of Staff Erik Shinseki's original goal of deploying one combat brigade, anywhere in the world, in less than 96 hours, using airlift rather than sealift. Additionally, his "transformation" goals call for the deployment of a division in 120 hours, and five divisions in 30 days. If realized, Shinseki's vision would set the Army on a peacetime alert posture necessary to conduct an operation on the scale of Normandy within 30 days notice, but from the air, with completely mechanized divisions.¹⁸⁴ Current estimates reveal, however, that it would take longer than 96 hours to deploy one brigade of the FCS. Even if it were possible to deploy a brigade in 96 hours, this capability does not adequately address "irregular warfare," and is driven more by Jomini's idea of quickly massing at some decisive point. The Army's focus on rapid deployment is based on the hope that winning a "decisive battle" during the initial outbreak of war can avert the need for a long-term mobilization of resources. Finally, it is unlikely that airlift can deliver the daily fuel requirement for such a force, or that it will be available in the theater of deployment.

Numerous studies reveal that airlift offers only marginal improvements in deployment time as compared to sealift or use of prepositioned stocks. One brigade of

¹⁸¹ John Gordon, David Johnson, and Peter Wilson. "Air-Mechanization: An Expensive and Fragile Concept." *Military Review*. (January-February 2007), 65.

¹⁸² Morton Halperin and Dave Halperin. "The Key West Key." *Foreign Policy*. No. 53. (Winter 1983-1984), 117.

¹⁸³ It is unlikely that the Army will actually attempt to build such an aircraft. Suggesting the possibility, however, serves as a bureaucratic statement directed at the Air Force. This type of aircraft will most likely be shot down if attempting to fly through even primitive air defenses.

¹⁸⁴ The U.S. portion of the initial invading force at Normandy consisted of five light infantry divisions.

FCS equipment is projected to weigh 18,700 tons, as compared to the current 25,000 ton modular heavy brigade.¹⁸⁵ Based on the *Air Mobility Planning Factors* pamphlet issued by the U.S. Air Force Air Mobility Command, it would take 20 days to deploy an FCS equipped brigade and 23 days to deploy a modular (or pre-modular) heavy brigade using airlift from Savannah, GA to Djibouti, East Africa.¹⁸⁶ Using sealift, it would take 25 days for either type of brigade. In 2002, RAND calculated deployment times for the 12,840 ton Stryker Brigade Combat Team (SBCT), based on optimistic sortie rates, and the assumption of having advanced airfield facilities. The first chart below illustrates RAND's estimates on deployment of Stryker brigades with airlift:

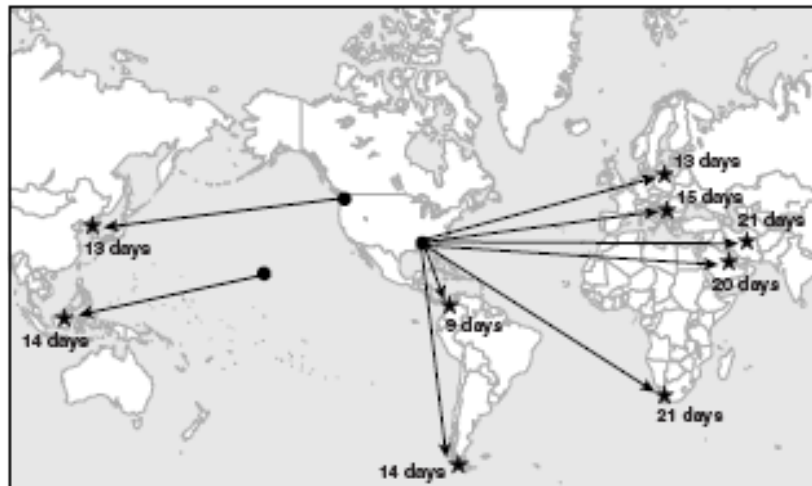


Figure 3: Deployment of SBCT Using Airlift.¹⁸⁷

¹⁸⁵ Frances Lussier, *The Army's Future Combat Systems Program and Alternatives* (Washington, D.C.: Congressional Budget Office, 2006), 36.

¹⁸⁶ The variables used to calculate deployment time are: tonnage, dimensions, number of aircraft, hours each aircraft will fly, time needed to fly to and from destination. Using the Air Force's planned fleet of 180 C-17 aircraft, given the distance from Savannah, GA to Djibouti, East Africa, assuming that airfields will be used for 24 hours per day, and that it would take 3.5 hours to unload equipment. Based on: Department of the Air Force, Air Mobility Command, *Air Mobility Planning Factors*. Pamphlet 10-1403 (18 December 2003). RAND estimates are more optimistic, as they are based on a higher sortie rate, yet still short of the goal.

¹⁸⁷ From Alan Vick, David Orletsky, Bruce Pirnie, and Seth Jones. "The Stryker Brigade Combat Team: Rethinking Strategic Responsiveness and Assessing Deployment Options." (Santa Monica, CA: RAND, 2002), 23.

This second chart illustrates calculations based on sealift:

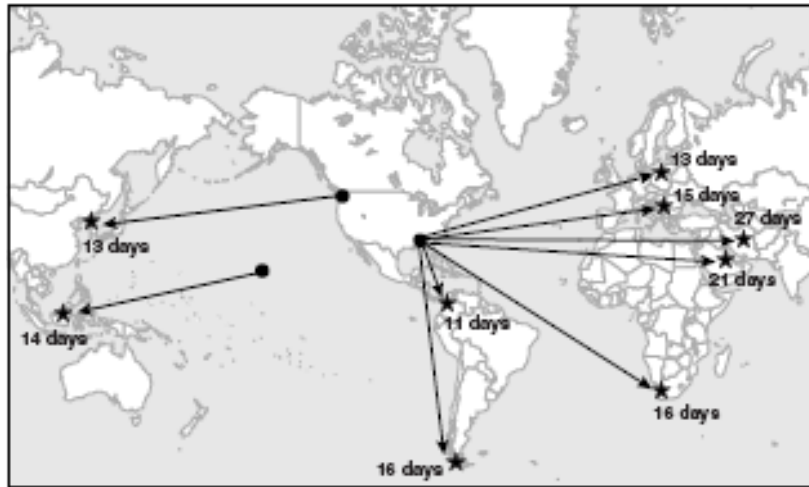


Figure 4: Deployment of SBCT Using Sealift¹⁸⁸

In some cases, deployment of one brigade with airlift takes longer than sealift. Furthermore, it is unlikely that only one brigade will be deployed in a contingency. SBCT equipment weighs less than the projected weight of a FCS brigade. At best, FCS brigades can deploy with airlift an average of three to five days faster than current forces utilizing sealift, at a projected cost of \$200 billion, for an operational status by 2025.¹⁸⁹ A gain of three to five days in reaction time is hardly “transformational.” Also, sealift can accommodate a much higher tonnage in the same time period, which means that more units can deploy in the same time frame, with the logistics necessary for their support.¹⁹⁰

Fuel is the most constraining logistical factor for mechanized forces, and the volume necessary to conduct operations has increased in recent history. The fuel efficiency requirements for FCS vehicles are deceiving. The 33-50% reduction in fuel consumption is based on attaining rates that are better than only the Abrams tank, rather

¹⁸⁸ Vick et al., “The Stryker Brigade Combat Team,” 23.

¹⁸⁹ United States Government Accountability Office. (GAO-07-380). “Role of Lead Systems Integrator on Future Combat Systems Program Poses Oversight Challenges.” (Washington, D.C.: GAO, 2007), 1. This amount can purchase 15 brigades worth of equipment.

¹⁹⁰ Lussier, *The Army’s Future Combat Systems Program and Alternatives*, 36.

than a rate better than the average of all Army vehicles.¹⁹¹ The Army promotes hybrid FCS vehicle designs as if meant to attain greater fuel efficiency. In reality, the purpose of the hybrid design is to meet power generation requirements for numerous electronic components, rather than to increase fuel efficiency. For example, the 1,500 horsepower turbine on the Abrams tank is complimented in later designs by an auxiliary generator mounted on the back of the turret to provide power for turret systems and new electronics without having to run the turbine. The hybrid FCS vehicle design will eliminate the need for auxiliary power units, but will require significant quantities of fuel, as the electronic subsystems can only function for less than one hour in “silent watch” mode using battery power, without running engines.¹⁹²

Airlift scenarios used by planners overlook logistical requirements necessary to sustain the FCS once deployed. As a reference point, the peak fuel consumption rate for Allied ground forces in Europe during World War II, occurring between the breakout from Normandy and Victory in Europe, was around one million gallons per day. This was delivered using a combination of supply trucks, fuel depots and the construction of pipelines-under-the-oceans (PLUTO).¹⁹³ General George Patton’s 3rd Army (400,000 men) burned 380,000 gallons per day at peak consumption during pursuit and exploitation operations.¹⁹⁴ During the lowest point (August 31 to September 8, 1944) in fuel distribution, at 31,000 gallons per day, Patton told Eisenhower, “My men can eat their belts, but my tanks gotta have gas!”¹⁹⁵ In contrast, during the invasion of Iraq,

¹⁹¹ Joseph Mait and John Grossman. “Relevancy and Risk: The U.S. Army and Future Combat Systems.” *Defense Horizons*. No. 13 (May 2002), 5. Fuel efficiency goal is stated as three miles per gallon.

¹⁹² United States Government Accountability Office. “Defense Acquisitions: Key Decisions to Be Made on Future Combat System.” Report to Congressional Committees. (Washington, D.C.: GAO, March 2007), 13.; “Silent watch” mode consists of the operation of vehicle sensors using battery power without running the engine.

¹⁹³ Arnold Krammer. “Operation PLUTO: A Wartime Partnership for Petroleum.” *Technology and Culture*, Vol. 33, No. 3 (Jul., 1992), 441-466.

¹⁹⁴ Steven Anders. “POL on the Red Ball Express.” *Quartermaster Professional Bulletin*. (Spring 1989), 2.

¹⁹⁵ Ibid.

ground forces smaller than that of Patton required 1.5 million gallons of fuel per day.¹⁹⁶ Fuel consumption for ground forces in Iraq has since increased to a steady rate of 1.7 million gallons per day.¹⁹⁷ Most Army vehicles burn JP-8, weighing six pounds per gallon. This equates to 5,100 tons of fuel per day consumed by ground forces during combat operations in Iraq.¹⁹⁸ The weight of fuel constitutes 70% of the tonnage of logistical support for mechanized forces.¹⁹⁹ If the FCS burns 50% less fuel than current forces, then eight days of fuel supply still weighs more than the total tonnage for one FCS brigade worth of equipment. This is not factored into the Army's overly optimistic deployment calculations. It is unlikely that aircraft can transport FCS brigades while simultaneously transporting this volume of fuel using storage bladders, in the event fuel cannot be seized in a hostile area.²⁰⁰ The more prudent manner of calculating deployment times is to plan backwards by first considering the logistical requirements, as there is no point in deploying vehicles without fuel.

1. Historical Cases of Air-Mech

Armored vehicles have been deployed by aircraft to a hostile environment on two occasions. The characteristics and outcome of these two cases are useful in determining the potential and shortcomings of FCS units intended to deploy using aircraft. Just because a particular type of operation was successful in the past does not mean that that a similar type of operation will be successful in the future. From a technical and historical standpoint, air-mechanization is possible for units smaller than a brigade. Such a feat

¹⁹⁶ Claude Christianson. "Secretary of the Navy Guest Lecture Series." Naval Postgraduate School. Monterey, CA (14 August 2007). Lieutenant General Claude Christianson, Director for Logistics, Joint Staff, states this figure. General Christianson was in charge of all logistics during the invasion of Iraq. Other sources (Thomas Adams, *The Army After Next*) suggest a higher volume of 2 million gallons per day. Regardless, both estimates are higher than peak estimates for Patton's Army.

¹⁹⁷ Robert Bryce. "Gas Pains." *Atlantic Monthly*. (May 2005).

¹⁹⁸ This is based on the following calculation: 1,700,000 gallons x 6 (pounds per gallon), divided by 2,000 (pounds per ton).

¹⁹⁹ National Research Council Committee to Perform a Technology Assessment Focused on Logistics Support Requirements for Future Army Combat Systems "Reducing the Logistics Burden for the Army After Next: Doing More with Less." (Washington, DC: National Academy of Sciences, 1999), 48.

²⁰⁰ Furthermore, transport aircraft will require significant fuel for return flights. For example, the C-17 fuel tank tops off at 35,546 gallons. At: <http://www.af.mil/factsheets/factsheet.asp?fsID=86>. Accessed on 25 Feb 08.

illustrates mastery over unique tactical and technical skills, combined with a particular sense of urgency to employ force. The strategic feasibility of the Air Mech concept, however, depends upon the nature of the political objective, and whether it can be accomplished rapidly. The following cases illustrate the political and logistical complexities of the concept, as these two areas are linked.

2. Operation Jonathan

The Air-Mech concept was first used by Israel in 1976 to rescue hostages from a state-sponsored terrorist group. On June 27, 1976, a commercial airline (Air France) departing Israel was hijacked by terrorists from the Popular Front for the Liberation of Palestine (PFLP).²⁰¹ After a temporary stop at Benghazi, Libya, the hijacked plane and passengers arrived at an airport in Entebbe, Uganda (East Africa).²⁰² The passengers were held by terrorists, with the cooperation of Ugandan soldiers, in an old terminal building. The Israeli passengers on board were taken hostage, while French citizens (other than the crewmembers, who refused to leave) were released.²⁰³ At this point, it became clear Idi Amin, the president of Uganda at the time, was collaborating with the terrorists. On July 4, 1976, Israel used C-130s to deploy motorized forces supported by armored vehicles a distance 2,220 miles, to Entebbe, Uganda, in order to rescue the hostages.²⁰⁴ The motorized forces consisted of a Mercedes (bearing the Ugandan flag to appear as an official vehicle) and two Land Rovers.²⁰⁵ Four APCs (Armored Personnel Carriers) and dismounted infantry supported the motorized forces. According to the commander of the C-130 squadron, Lieutenant Colonel Joshua Shani, “The plan was relatively simple. It was based on the fact that no one would think we were crazy enough to fly there, so it would be a total surprise.”²⁰⁶

²⁰¹ William McRaven. *Spec Ops: Case Studies in Special Operations Warfare Theory and Practice*. (Novato, CA: Presidio, 1996), 333.

²⁰² Ibid.

²⁰³ Ibid., 337.

²⁰⁴ Ibid., 335.

²⁰⁵ Ibid., 347.

²⁰⁶ Ibid., 334.

During the operation, APCs destroyed eight MiGs while they were still on the ground, and assisted in securing fuel for the C-130s return flight.²⁰⁷ Ten fuel technicians accompanied the mission to facilitate this process.²⁰⁸ Additionally, Israelis brought a portable pump in case fuel could not be pumped from the airport's underground storage tanks with Ugandan pumps.²⁰⁹ After about two hours from the time the first C-130 landed, 106 hostages were rescued. Ultimately, the refueling effort was cut short forty minutes prior to completion, given the need to leave Uganda immediately after the hostages were secured. Kenya granted permission for a refueling stop in Nairobi. At this point the mission was leaked to the media, and Israel dispatched a fighter escort for the final leg of the egress, fearing a fighter aircraft interception on the C-130s from either Egypt or Saudi Arabia.²¹⁰

Overall, the operation was viewed by Israelis as a success, but not without losses. Four Israeli soldiers were killed, including the commander, Lieutenant Colonel Jonathan Netanyahu, who was shot in the chest while leading the operation. One hostage was not rescued. Seventy-five year old Dora Bloch, was not in the terminal building because she was brought to the hospital the day prior to the operation, after choking on food. Dora Bloch was later executed in retaliation for the hostage rescue operation and destruction of the MiGs.²¹¹

Prior to Operation Jonathan, the Israeli strategy of refusing to negotiate with terrorists was having a devastating effect upon national pride in light of failed hostage rescue attempts in 1974 and 1975.²¹² Operation Jonathan restored Israeli confidence in the IDF and its Sayeret Matkal Counterterrorist Unit (known as The Unit). Israel used the Air-Mech concept in 1976, in part, because the nature of the political objective (rescuing hostages) involved either immediate success or complete failure. The objective

²⁰⁷ McRaven. *Spec Ops: Case*, 364.

²⁰⁸ Ibid., 356.

²⁰⁹ Ibid.

²¹⁰ Ibid., 366.

²¹¹ Ibid., 333-367.

²¹² Ibid., 333-367; In 1974, terrorists killed 22 schoolchildren during a failed hostage rescue attempt. In 1975, eight hostages were killed during a rescue attempt.

was accomplished in less than two hours. If Israeli armored vehicles remained in Uganda for a significant period, the Ugandan Army would have overwhelmed them.²¹³ Even within this short time span, fuel considerations were a primary concern, as part of their mission involved securing a fuel supply.

Missions involving the Air-Mech concept must have political objectives that can be accomplished in a short time. Rescuing hostages, capturing enemy personnel, preempting the use of WMDs, or seizing other critical equipment may fit these parameters. If the FCS is deployed to perform a mission involving occupation of territory or “regime change,” it is unlikely this can be accomplished in a short time span. The Israeli case suggests that a successful Air-Mech raid calls for extensive cooperation between special operations forces and conventional mechanized units. Furthermore, the use of aircraft to move forces on short notice requires immediate diplomatic coordination with allies, and the use of fighter aircraft to guard against an attack by neutral countries whose airspace may be violated during the operation.

3. Operation Airborne Dragon

During the planning process for the U.S. invasion of Iraq in 2003, Turkey denied permission for the 4th Infantry Division to enter Iraq from the north. The initial invasion plan was based on a two-pronged attack. Turkey’s decision forced planners to develop an alternate method of introducing ground forces into northern Iraq. Proponents of the FCS argue that it would have been ideal in this scenario, because the vehicles are designed to conduct Air-Mech operations. Without this option, the Army deployed a small armored force to northern Iraq using C-17s. This force was under the control of Special Operations Command, and consisted of the 173rd Airborne Regiment, reinforced by Task Force 1-63 Armor. The latter was organized with Abrams tanks, mechanized infantry, engineers, scouts, military police, maintenance vehicles, and other logistical support.²¹⁴ This small force deployed on 30 C-17 sorties. Once deployed, TF 1-63 AR

²¹³ Without armor support and firepower, on the other hand, foot soldiers might not have the covering fire necessary to secure fuel for the C-130 return flight, and to destroy the eight MiGs that may have intercepted the withdrawal of the force.

²¹⁴ Patrick Warren and Keith Barclay. “Operation Airborne Dragon, Northern Iraq.” *Military Review*. (November-December 2003), 13.

required 10,000 gallons of fuel per day, and a continual stream of repair parts flown from its motor pool sustainment stocks in Germany.²¹⁵ This was the first time Abrams tanks were inserted into hostile environment using aircraft. Special Forces teams secured fuel depots in Iraq prior to the arrival of the force.²¹⁶ Additionally, military planners secured a line-haul contract (semi trucks) with a private Turkish company for fuel delivery, while diplomats obtained permission from the Turkish government.²¹⁷ Kurdish factions in Iraq assisted in distribution of commercial fuel movements.²¹⁸ These actions were necessary to support a company-sized element of Abrams tanks, a company of Bradleys, and two companies of M113 armored personnel carriers.

The tanks inserted into northern Iraq in 2003 were able to conduct operations without significant casualties or damage to equipment, while maintaining a 90% operational ready rate.²¹⁹ According to Army planners, these forces accomplished their initial entry mission, and were “nearly impervious to Iraqi weapon systems.”²²⁰ Shortly after their arrival, “enemy divisions in northern Iraq began to disintegrate.”²²¹ The overall success of operations in northern Iraq, however, is questionable, considering Turkey recently decided to introduce ground forces in the region, due to concerns with regional instability. It is too early to assess the long-term strategic outcome of military operations in northern Iraq. Operation Airborne Dragon illustrates that a battalion-sized mechanized force can be introduced in a hostile environment with aircraft, given significant light infantry support, extensive logistical arrangements, destruction of enemy air defense, regional allied support (i.e. German basing, Turkish fuel), and the eventual arrival of follow on forces supplied from a port.

²¹⁵ Warren and Barclay, “Operation Airborne Dragon,” 14.

²¹⁶ Ibid.

²¹⁷ Ibid.

²¹⁸ Ibid.

²¹⁹ Ibid.

²²⁰ Ibid., 11.

²²¹ Ibid.

4. Analysis of Air-Mech Concept

Operation Jonathan and Operation Airborne Dragon prove that a small armored force can be inserted into hostile territory using aircraft. Although both cases were successful, this does not mean that the FCS should be based on the Air-Mech concept. It is unwise to base the FCS program's design constraints exclusively on having this capability, considering that supply lines will eventually be established from a port in a long-term operation. The feat has already been accomplished with existing forces, under extreme conditions, at the very limit of the concept's utility. Depending on the specific mission assigned to FCS brigades, air-mechanization may be useful, but it is important to understand basic political limitations of the concept. Restructuring the entire U.S. Army's capabilities based on considerations involving only the first 30 days of a war is problematic if engaged in a "Long War." The U.S. Army already has an advantage in the rapid, decisive use of force to destroy conventional ground forces, as it spent most of the Cold War pursuing capabilities in this area.²²²

From the perspective of international politics, pursuit of the Air Mech concept is based on the belief it provides a capacity for unilateral action with military forces. In both cases examined, however, extensive allied support was required to deploy armored forces with aircraft in a hostile environment. From the perspective of domestic politics, having such a capability is based on the fact that generations of politicians in the Midwest have preferred for the bulk of the U.S. Army's mechanized forces to remain in bases originally intended for subduing various Indian tribes along the frontier of American expansion during the 19th Century. Today, there is little remaining of these Indian tribes, and the American "frontier" is located in a different hemisphere. Railroad companies are eager to secure contracts to move Army equipment almost one thousand miles via railroad from bases in the middle of Texas, Kansas, or Colorado to port cities such as Beaumont, Texas, located along the Gulf of Mexico. This logistical task can be accomplished with remarkable speed, yet it would not be necessary if it were not for the historical influence of the Cherokee, Choctaw, Sioux, and Pottawattamie Indian tribes on

²²² Air-Mech is a matter of doing something that has already been done, only marginally better.

current Army basing.²²³ The technical issues of the Air-Mech concept are simply a minor manifestation of larger political issues beyond the scope of what 27-ton vehicles can address.

The first FCS brigade will originate from the Army Evaluation Task Force (AETF), formed in February 2007.²²⁴ This brigade is scheduled to be operational in 2015, and will be located in Fort Bliss, Texas, about 700 miles from the nearest port, Corpus Christi, Texas.²²⁵ At this location, despite the Army's visions of Air-Mech, FCS equipment will probably one day be loaded onto ships, after first being loaded and unloaded onto rail cars, just as the first "interim force" SBCT deployed to Iraq on ships from the port of Tacoma, Washington rather than by C-130.²²⁶

B. SYSTEM OF SYSTEMS COMMON OPERATING ENVIRONMENT

Most of the focus on the FCS is on the hardware, while the software component is overlooked. The software is significant because it is the more ambitious aspect of the FCS program. FCS software requires developers to write 34 million lines of code.²²⁷ This is five times as many lines as necessary for the Joint Strike Fighter, the largest defense undertaking in terms of software to date.²²⁸ All components of the FCS will depend upon the software for successful operation. The System-of-Systems Common Operating Environment (SOSCOE), according to journalist Alec Klein, "is supposed to

²²³ Frederick Kagan. *Finding the Target*. (New York: Encounter Books, 2006), 284.

²²⁴ Sarah Wood. "Army to Test Future Combat Systems at Fort Bliss." *American Forces Press Service*. (30 January 2006). At: <http://www.defenselink.mil/news/newsarticle.aspx?id=14494>; The unit is 5th Brigade, 1st Armored Division. As part of a recent BRAC, 1st Armored Division is scheduled to move from Germany to this location, and eventually be equipped with the FCS, so it can rapidly deploy back to hemisphere it was moved from.

²²⁵ Based on Google Maps analysis. At: <http://maps.google.com>. Accessed on 25 Feb 08.

²²⁶ Thomas Adams. *The Army After Next*. (Westport, CT: Praeger, 2006), 172.

²²⁷ Testimony Before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, House of Representatives. (1 April 2004) "Defense Acquisitions: The Army's Future Combat Systems' Features, Risks, and Alternatives." (Washington, DC: United States General Accounting Office), 10.

²²⁸ Ibid; In 2008, the *Washington Post*, however, indicates that the requirement has grown to 63.8 million lines of code. At: <http://www.washingtonpost.com/wp-dyn/content/story/2007/12/06/ST2007120602927.html>. Accessed on 5 Feb 08.

be like Windows, the world's dominant operating system, only better.”²²⁹ SOSCOE is currently being developed by Boeing and Science Applications International Corporation (SAIC), through a variety of subcontracts.²³⁰ In 2004, SAIC was unable to provide the Federal Bureau of Investigation (FBI) with computer systems to replace paper files, after three years and \$170 million.²³¹ The difficulty in developing software for networking in stationary buildings, such as FBI offices, is compounded when developing software that can, according to Klein, “conduct a video teleconference in a tank rumbling about 40 mph in the haze of battle.”²³² The purpose of SOSCOE, however, is not simply to provide remote video teleconference capabilities via a secure network. SOSCOE is intended for remote control over MGVs and UGVs, and UAVs, as well as sensor feeds and control over long-range strike systems. This network has been described by its designers as “the glue that holds FCS together.”²³³

Boeing and SAIC will require \$6 billion to design the FCS software alone.²³⁴ This is about three percent of the projected total program cost of \$200 billion.²³⁵ From a business perspective, it makes more sense to design the software first, given the fact that the combat effectiveness of the new vehicles depends on the software, and current vehicles have heavier armor.²³⁶ Furthermore, it is unclear if there are security protocols for many of the subcontracts involving writing the computer code. Countries such as

²²⁹ Alec Klein. “The Complex Crux of Wireless Warfare.” *Washington Post*. (24 January, 2008), D1. The SOSCOE software will use publicly available Linux-based code in order to avoid doing business with Microsoft.

²³⁰ United States Government Accountability Office. (GAO-07-380). “Role of Lead Systems Integrator on Future Combat Systems Program Poses Oversight Challenges.” (Washington, DC: GAO, 2007), 1.

²³¹ Klein, D1.

²³² Ibid.

²³³ Dave Bassett and David Emery. “SOSCOE- The Glue That Holds FCS Together.” *Army Acquisition, Logistics and Technology Magazine*. (September-October 2005), 21.

²³⁴ Klein, D1.

²³⁵ Six divided by 200.

²³⁶ Significant technical problems may occur, however, if SOSCOE components are simply added to current vehicles. For example, the internal sight for the Abrams tank commander's machine gun has already been removed to make room for a computer screen intended for increased “situational awareness.” This has negated the protective function of the 70-tons of armor, as commanders must fire the machine gun from the hip, while standing exposed from the turret, where snipers might engage them.

China may attempt to introduce a computer virus or Trojan horse into FCS software during the development phase.²³⁷ A virus might simply cause the network to fail, but a Trojan horse could tap into the functions of the FCS, move vehicle icons on computer screens, or cause “friendly” weapons systems to target one another, whereby the FCS would destroy itself or initiate hostilities with non-belligerent parties in a deployed area of operations.

SOSCOE is designed in accordance with the Army’s goal for operational capabilities, stated in the doctrinal publication *FM-1, The Army*:

The goal of Army Operations will be to simultaneously attack critical targets throughout the area of operations by rapid maneuver in multiple dimensions and precision fires... Improvements in situational understanding will facilitate extremely rapid, non-contiguous decentralized operations.²³⁸

This translates to mean that the Army views its primary future operational role as one of destroying targets all over the place at the same time, rather than one at a time in a sequential manner. This is the purpose of the SOSCOE network, by way of long-range sensor-to-shooter linkages. Whether target destruction occurs simultaneously or sequentially, however, is a mere technicality, and serves as an inadequate goal for the operational capabilities of the U.S. Army. This operational goal does not correspond with political objectives assigned to the Army, such as occupation of territory, control of population, or “regime change.” The statement serves as a reiteration of Cold War operational objectives, which called for simultaneously attacking multiple echelons of the Soviet Army. The influence of air power theorists such as John Boyd and John Warden

²³⁷ Klein, D1. Klein interviewed officials from Boeing who said, “We go through a series of tests to defend against all of those threats.” The Defense Science Board, however, raised concerns that foreign programmers might introduce malicious code, and believe current security protocols do not adequately address this issue.

²³⁸ The foreword of this manual, written by Army Chief of Staff Peter Schoomaker, states, “FM 1 establishes the fundamental principles for employing landpower. The most important of these are the Army’s operational concept and the fundamentals that support it. They form the foundation for all Army doctrine. All Soldiers should understand and internalize them.” Department of the Army. *FM-1 The Army*. (Washington, DC: Government Printing Office, 2005); The statement is quoted in the above manner in a corporate (BAE Systems) publication by Jean-Pierre Lutz, Program Manager of Overwatch Systems for the FCS.

has added new verbiage to old concepts, and are apparent in such doctrinal statements.²³⁹ The statement is based on the idea that the simultaneous use of precision firepower to destroy multiple targets will somehow “shock and awe” an opponent. This may indeed facilitate destructive effects on a whole (system, regime leadership, or society) that are greater than the sum of the parts. Regardless, one of the historical roles played by armies is to seize territory and control population. Navies and air forces cannot do this. The U.S. Army will become irrelevant if it neglects this basic role in pursuit of capabilities similar to that of the U.S. Air Force. On the other hand, it is impossible to seize and hold territory without first destroying indirect fire systems that serve to deny access to terrain. If the latter can be accomplished with sensors, networks, and automated systems requiring less personnel, then remainder of personnel should be shifted to permanent roles involving control of territory and populations.

Proponents of FCS contend that tactical problems in Iraq and Afghanistan can be addressed with long-range firepower by avoiding the dangerous “close fight” where soldiers are killed with IEDs and small arms fire. The following slide used by retired Army General Scales in briefings illustrates this point:

²³⁹ David Fadok. “John Boyd and John Warden: Air Power’s Quest for Strategic Paralysis.” (Maxwell: Air University Press, 1995), 39. Fadok traces the development of Boyd and Warden’s theories regarding the simultaneous attack of multiple targets at different locations with the goal of producing strategic paralysis, a sort of “shock and awe.” Current Army doctrine has similarities with these theories, despite the fact that they were developed by fighter pilots, and do not relate to basic aspects of land warfare such as the domination of territory or population.

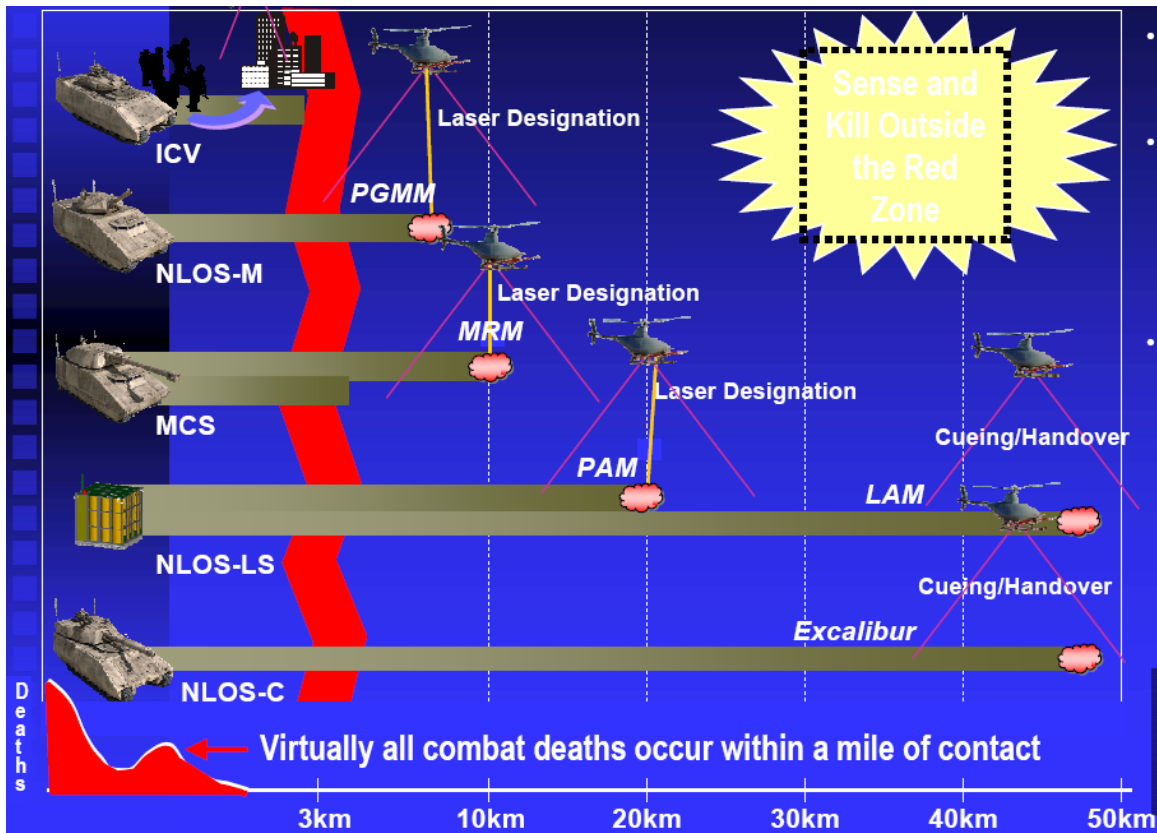


Figure 5: Slide Used to Brief FCS Capabilities (From Boeing)

Based on this slide, sensor linkages will allow soldiers to “sense and kill outside the red zone,” thereby completely avoiding having to address counterinsurgency through interaction with the population.²⁴⁰ According to General Stephen Speakes and Colonel Gregory Martin, however, “These efficiencies will allow a Future Combat Systems BCT to field twice the number of infantrymen as today’s heavy BCTs... with machines replacing soldiers in many of the most dangerous tasks.”²⁴¹ This is based on the notion that more “boots on the ground,” though operating from networked armored vehicles, suffices to address counterinsurgency. Ultimately, what matters most is the type of tasks these mechanized infantry are asked to perform. It requires significant training for

²⁴⁰ “Sense and kill outside the red zone” is stated in the yellow portion of the slide, which may be difficult to read.

²⁴¹ Stephen Speakes and Gregory Martin. “Army Modernization in an Era of Persistent Conflict.” *Army*. (January 2008), 36.

infantry to perform their existing tasks, as noted by an infantry battalion commander, “...there is a notion by some that everyone is an Infantryman in the future force – as if anyone can just do it like taking out the garbage or something. Infantry skills are complex and take a lot of quick reflex and physical training to survive.”²⁴² In reality, the next generation of infantry, if provided FCS vehicles, will have to learn how to replace vehicle track, maintain traditional infantry skills, operate new computer software, and address counterinsurgency – all at the same time.

Critics of the FCS argue that automated long-range sensors and indirect firepower are only useful for traditional conventional operations in open terrain against an opponent utilizing tanks and other armored vehicles that can be tracked with sensors. The ability to transmit information on wireless tactical data networks, however, may offer significant capabilities for irregular warfare by embracing the “close fight” rather than avoiding it.²⁴³ Increased data collection and sharing mechanisms are useful for controlling populations, if used for lateral unit coordination by cataloguing individuals in a networked database rather than for transmission of targeting data used for artillery or remote controlled missiles. In any case, the current FCS network design is focused on providing “real time sensor-to-shooter linkages.”²⁴⁴ The following scenarios illustrate the use of existing radar systems with this capability in situations encompassing both traditional and irregular challenges. These systems provide an example of what may be possible with the SOSCOE.

²⁴² Thomas Adams. *The Army After Next*. (Westport: Praeger Security International, 2006), 239.

²⁴³ Getting closer to the population with technology is another option. This can be performed by building networked databases of individuals, using digital cameras, fingerprints, retinal eye scans, tattooed UPC bar codes, DNA, or some other method. These databases can be accessed (created and shared) from vehicles when searching personnel, in order to track potential insurgents, and control populations.

²⁴⁴ Jean-Pierre Lutz (Program Manager of Overwatch Systems for FCS, BAE Systems). “FCS: C4ISR.” At: <http://www.tactical.overwatch.com/News/C4ISR-Army-Article-092605.pdf>. Accessed on 20 Feb 08.

Technology such as the Global Positioning System (GPS), Joint Surveillance and Target Attack Radar System (JSTARS), and reconnaissance satellites are often attributed to increased targeting capability, while the role of field artillery radars developed during the same period are often overlooked. Army radars serve the traditional purpose of keeping indirect fire weapon systems out of battlefield action, whether with air defense radars that keep away hostile aircraft, or radars designed to locate artillery tubes and mortars by tracking the trajectory of fired rounds. In this latter role, the U.S. Army's Q-36 and Q-37 radars played an important role in Kosovo, Afghanistan, and Iraq.

After the Gulf War in 1991, an Iraqi artillery battalion commander stated, "after a month of bombing, I had 17 of 18 tubes left. After one day of ground war—with the US using Multiple-Launch Rocket System (MLRS) fires—I had one tube left."²⁴⁵ In 2002, Rumsfeld quoted this statement when testifying before Congress on his plan to cancel Crusader.²⁴⁶ He emphasized the MLRS when quoting the Iraqi commander's statement to imply indirect fire rocket systems were more relevant than tube artillery. Proponents of ground forces, however, use the statement as evidence the introduction of ground forces proved decisive, since aerial bombardment did not cause the Iraqi Army to withdraw from Kuwait. Ultimately, as evident in Kosovo eight years later, it does not matter where the bombardment came from, but rather, how the target was found. Ironically, as military and political leaders debated on whether to commit Apache helicopters in Kosovo, computer networked radar systems, as part of the supporting equipment for the Army's deployment, played the more decisive role in the conflict.

1. Counterbattery Radars in Kosovo

During Operation Allied Force in 1999, Serbian President Slobodan Milosevic agreed to a peace settlement after 78 days of NATO bombing. It appeared to some that air power alone achieved victory.²⁴⁷ Assessing why Milosevic capitulated on the 78th

²⁴⁵ Donald Rumsfeld, "Prepared Statement on the Crusader Recommendation before the Senate Committee on Armed Services." (16 May 2002), 12.

²⁴⁶ Ibid.

²⁴⁷ Anthony Hinen. "War Can Be Won With Air Power Alone!" *Air and Space Power Journal*. (16 May 2002), 1 (see title).

day, rather than any other day, reveals the capabilities and limitations of networked sensors. During the Kosovo War, NATO Commander General Wesley Clark's decision to deploy Apache helicopters turned into a fiasco. The deployment of Apache helicopters was slow because the Army never planned on deploying attack helicopters unless they were part of a combined arms effort. Therefore, over 5,000 personnel were deployed in support of 24 helicopters.²⁴⁸ Adding to the embarrassment, several helicopters crashed during test flights once deployed. Supporting units for the 24 helicopters included a company each of tanks, infantry, and artillery, along with one MLRS platoon.²⁴⁹ Among the equipment assigned to field artillery units are the Q-36 and Q-37 (Firefinder series) counterbattery radars.²⁵⁰ Since MLRS and howitzers deployed to Kosovo, their associated radars also deployed. These radars played a vital role in the Kosovo conflict, despite having only been deployed because of a doctrinal chain of reasoning.

Serbian attempts to conceal artillery pieces from JSTARS and other Air Force surveillance assets were largely successful throughout the 78 days of bombing. Much of the Air Force Battle Damage Assessment (BDA) was deemed inaccurate and inflated after the conflict because the Serbs used wood burning stoves with angled chimneys to mimic artillery pieces.²⁵¹ They also used water containers that heated in the daytime sun to mimic the infrared signature of vehicles and hot artillery tubes. The Serbian artillery repelled attacks by the irregular Kosovo Liberation Army (KLA) forces backed by the CIA, while repositioning faster than the Air Tasking Order (ATO) could be generated. Lawyers from each of the NATO participants debated over the ATO targets because of differing interpretations of the proportionality principle in international law and disagreement over what exactly constituted a legitimate military target. These debates

²⁴⁸ Benjamin Lambeth, "NATO's Air War for Kosovo." *The Transformation of American Air Power*. (Ithaca and London: Cornell University Press, 2000), 208.

²⁴⁹ Lambeth, 208.

²⁵⁰ The AN TQP-36 and AN TQP-37 (Firefinder series), mentioned in Chapter II.

²⁵¹ *Ibid*, 197.

became commonplace due to the inability of JSTARS and other surveillance assets to accurately find targets.²⁵² In the final weeks of the war, however, the operational picture changed dramatically.

From May 26 to June 7, in the area south of Mount Pastrik, Kosovo Liberation Army (KLA) guerillas and Serbian Army forces became locked in an artillery duel.²⁵³ This coincided with the completion of the deployment of equipment accompanying the Army's 24 helicopters. Although the Serbian artillery hid from the JSTARS, it could not hide from the Army's Firefinder radars. When the Serbian artillery fired, these radars acquired their position based on the trajectory of the rounds and relayed this information via the Advanced Field Artillery Tactical Data System (AFATDS). The AFATDS is capable of electronically integrating the management of artillery fires, close air support, and naval gunfire.²⁵⁴ This data management system allowed accurate coordinates for Serbian artillery to be passed on to planners.

Apache helicopters played no role in the Kosovo War, although their supporting planning staffs and equipment played a significant role. U.S. Army corps level planners in the Battlefield Coordination Element (originally created to coordinate "deep operations" against second echelons of the Soviet Army in accordance with AirLand Battle) stated the following:

The CAOC Ground Analysis Cell tried to fill the void as the TF Hawk ACE/G2 focused solely on developing targets for Apache helicopter engagement areas in Kosovo. After realizing that the Apaches would not be employed in Allied Force, TF Hawk began to nominate targets to the CAOC through the BCE.²⁵⁵

²⁵² Adams, 57. Between 2,000 and 5,000 civilians were killed by NATO bombs.

²⁵³ Lambeth, 190.

²⁵⁴ AFATDS. At: <http://www.fas.org/man/dod-101/sys/land/afatds.htm>. Accessed on 10 Dec 07.

²⁵⁵ Robert Bridgford, Neil Hersey, and James Varner. "Lessons Learned from Operation Allied Force in Kosovo." *Field Artillery* (January 2000), 11.

This complex jargon translates to mean that Army planners passed Firefinder radar targets to Air Force planners, since the Apache helicopters were too vulnerable to utilize in a tactical environment where the other side shoots back.²⁵⁶

Once the Air Force demonstrated the capacity to hit something other than wood burning stoves, perhaps Milosevic took threats from the air more seriously, as he agreed to settle the conflict three days after the first bomb was dropped on a target acquired by Firefinder radar. Milosevic realized that NATO could finally target his artillery, and chose to withdraw with his army still intact.²⁵⁷ In retrospect, Milosevic stated that he agreed to a peace settlement with NATO because of concerns regarding civilian casualties from bombings, as the U.S. started bombing electrical grids and other civilian infrastructure targets. In reality, however, the Q-36 and Q-37 acquisitions put Milosevic in an awkward position. At this point, the next logical step for the Serbian Army would be to emplace artillery pieces next to schools or other locations in close proximity to civilians. These actions would have turned the population against Milosevic.

Modern warfare involves complex systems that function in a manner greater than the sum of their parts. Nevertheless, it is important to determine which cogs in the war machine proved decisive. At the tactical level, the Serbian Army faced mortal danger because of a U.S. Army warrant officer's decision on where to emplace counterbattery radars. This decision caused a private to park a truck somewhere, making sure the generator powering the radar had fuel before taking a nap in the cab of the truck, soothed by the steady drone of the engine.²⁵⁸ Meanwhile, generals, lawyers, pilots, and even the President of the United States, debated the targets of the next bombing run and whether to commit the helicopters. After the conflict, General Jumper, the commander of the United

²⁵⁶ There was initial concern that friendly aircraft might accidentally engage the Army's radars if they were turned on. "Aircraft such as the EA6B and the F16CJ are armed with the high-speed anti radiation missile (HARM), a missile designed to detect emitters and suppress enemy air defenses (SEAD)." Brigford, Hersey, and Varner, 12.

²⁵⁷ Franklin Spinney. "Learning the Lesson We Want to Learn?" *Proceedings of the U.S. Naval Institute*. (September 1999), 6. Spinney argues the Serbian Army was still intact when it withdrew.

²⁵⁸ This last part is based on conjecture.

States Air Forces in Europe (USAFE) stated that the counterbattery radars of the U.S. Army played “a very big part” in the final stages of the campaign.²⁵⁹

After planners released control over stove-piped information out of frustration, the Firefinder radar became the key link in the “system of systems” that caused Milosevic to capitulate. The only significant tasks personnel operating this sort of system perform involve positioning equipment and refueling, thereby allowing the war machine to take on a life of its own. This is not the view of modern war that professional warriors would subscribe, and evident with the focus on direct-fire weapon systems such as the Apache, which is nothing more than a vulnerable infantryman in the sky with a vast amount of firepower.

Attack helicopters are modern-age expressions of traditional military culture. The Apache is loud and menacing, designed to cast aside all danger and fight at treetop level, contrasted against an open sky, serving as the ultimate expression of institutional culture, camouflaged in high-technology form. This became evident to the Army three years after the Kosovo experience. During the invasion of Iraq in 2003, the 11th Aviation Regiment, consisting of Apache helicopters, conducted a full retreat after receiving a hail of fire from AK-47s while conducting their first “deep attack” of the war.²⁶⁰ From the perspective of military culture, the AK-47 is more advanced than the Apache, as it was the first rifle adopted by a modern army that did not have a bayonet lug.²⁶¹ In contrast, the M-16 has a bayonet lug, and U.S. Army basic training still contains countless hours of bayonet drill, bayonet obstacle courses, and learning how to march like automata in compact formations.

The Apache exists because of events that long preceded it, such as the 1948 Key West Agreement, whereby the U.S. Air Force was no longer obligated to provide fire support to ground forces. This resulted from a course set much earlier. During World

²⁵⁹ Lambeth, 213.

²⁶⁰ Thomas Ricks. *Fiasco*. (New York: The Penguin Press, 2006), 119. One helicopter was shot down, and two crewmembers were captured, while 32 of the 33 Apaches that made it back to base were riddled with bullet holes. In 2006, the Army soberly concluded the Apache helicopter was so vulnerable to rifle fire that it would no longer have a role in deep attacks.

²⁶¹ Originally, it was not issued with a bayonet. Other countries, such as East Germany, later developed bayonets that fit round the barrel.

War I, units of horse cavalymen from several armies were spared the horrors of war, at the behest of traditionalists waiting to exploit a breakthrough that never occurred. These units waited impatiently far behind the trench lines, with personnel shifting to other roles, such as aviation.²⁶² Once these cavalymen took flight, after crossing the trench lines from above, their imaginations took flight with them also – flying past the gun lines – believing they could deliver war’s decisive blow directly against a society.²⁶³ The Apache is an equally absurd counter-reaction to these air power theories. The reality of modern war falls somewhere between the F-117 Stealth bomber and the Apache, and is manifested in frustrated staff officers, and a soundly sleeping private waking only to refuel generators. The Kosovo War highlights a growing divide between Army and Air Force capabilities and focus. This divide inspired the Army to develop something better than the Apache for fire support, and this is manifested in the SOSCOE.

2. Counterbattery Radars in Afghanistan and Iraq

During Operation Anaconda in Afghanistan in 2002, American and Afghan forces became pinned down in a complex ambush that included preplanned enemy mortar fire.²⁶⁴ Close air support was not immediately available, and the exact location of the enemy indirect fire systems was unknown. During the operation, eight Americans were killed and at least forty were wounded.²⁶⁵ Shortly after this incident, the Army quietly deployed a light field artillery battalion from the 10th Mountain Division, equipped with Q-36 and Q-37 radars. These radar sections combined with one platoon of guns became expertly versed in the artillery counterstrike drill, while the rest of the artillerymen adopted non-traditional roles. Counterstrike drills were practiced so that howitzers in the “hot platoon” could fire at the grid location of enemy mortars within minutes of radar

²⁶² O’Connell, 262.

²⁶³ Europeans, after experiencing the destructiveness of two World Wars, abandoned these concepts as they relate to international law. The United States, on the other hand, has not ratified Additional Protocol to the Geneva Convention regarding the targeting of civilians in war.

²⁶⁴ Keith Everett. “Not a Good Day to Die.” *Infantry Magazine*. (Jan-Feb 2006).

²⁶⁵ CNN. “Operation Anaconda Costs 8 Lives.” (4 March 2002). At: <http://archives.cnn.com/2002/WORLD/asiapcf/central/03/04/ret.afghan.fighting/index.html>. Accessed on 10 Feb 08.

acquisition. This assured that friendly forces maintained the ability to maneuver and never again received sustained indirect fire during future combat operations.²⁶⁶

The same counterstrike drills adopted in Afghanistan are only useful in the countryside of Iraq.²⁶⁷ Use of artillery strikes against rocket and mortar firing points has limited utility in crowded urban terrain because it causes excessive collateral damage. Furthermore, it is difficult for side-scanning radars to track objects that may be blocked by tall buildings. Because of these concerns, and the time necessary to clear crowded urban airspace prior to firing rounds, artillery counterstrikes are only used in remote areas of Iraq. In any case, radar still plays a vital role. The coordinates for the point of origin (POO) of a mortar attack can be transmitted to all friendly patrols near the launch. Patrols can quickly move to the location or isolate it by establishing roadblocks and checkpoints where cars are searched. Civilians in the area can be politely questioned and those in a hurry to leave can first have their hands tested for explosive residue. Also, UAVs can fly to the POO to track the escape route of insurgents. In these situations, using networked sensors, the exact location of the enemy is known. This information is only marginally useful in urban terrain, as units must maneuver aggressively to reach the location.

Silencing the enemy's indirect fires allows ground forces to operate in hostile terrain. As evident in Afghanistan, infantry cannot maneuver if faced with a significant number of these systems. Efforts to find and destroy artillery, rockets, and mortars are necessary in order to project ground forces into hostile areas. Winning wars is not simply a matter of putting more "boots on the ground" at some magical decisive point. It must not be forgotten, however, how they got there in the first place. The remote destruction of indirect fire systems located by various sensors is merely the price for entry. After arrival, depending on the nature of the political objective, there are additional burdens.

²⁶⁶ R. Levis. "Long Hard Road: NCO Experiences in Afghanistan and Iraq." (Fort Bliss: U.S. Army Sergeants Major Academy, 2007), 62.

²⁶⁷ Robert Castillo, "1st AD Hot Platoon in Iraq." *Field Artillery*. (May-June 2005).

3. Counterbattery Radar Developments

The next generation of Firefinder radar, the Q-47, appears similar to the last generation. It consists of a tall standing rectangular panel on a trailer towed by a truck (LMTV) with electric generators. It is capable of registering and adjusting friendly artillery fire while simultaneously monitoring hostile fire from up to 50 different locations at ranges from four to three hundred kilometers.²⁶⁸ Hostile artillery coordinates are digitally transmitted to a variety of other weapon systems using two separate communications networks.²⁶⁹ The Q-47 can roll-on and roll-off a C-130 aircraft without disassembly. Once deployed, it can be emplaced in 15 minutes and displaced in 7 minutes.²⁷⁰ The Q-47 only offers a marginal improvement in capability in comparison to Firefinder radar proposals made by civilians much earlier. The Q-36 radar, though designed in the 1970s, is actually more relevant today than the Q-47 because it tracks at close range. The Q-47 only tracks targets beyond four kilometers, at distances that correspond to the location of the second and third attacking echelons of the nonexistent Soviet Army. This radar cannot track mortars that are typically fired on bases in Iraq and Afghanistan at closer ranges. As a result of this shortfall, Special Operations Command, using its independent acquisitions authority, recently purchased the Lightweight Counter Mortar Radar. This radar tracks at short range (up to 7,000 meters) in 360 degrees, and is more useful in an irregular environment.²⁷¹

At an IEEE (Institute of Electrical and Electronics Engineers) conference in Dallas, Texas in 1998, attendees from the Institute for Defense Analyses (IDA) presented the concept of the airborne Firefinder radar. The idea resulted from observation of earlier targeting situations in Bosnia. The IDA project determined the feasibility of putting Firefinder radar on the Global Hawk Unmanned Aerial Vehicle by modifying the existing synthetic aperture radar. The increase in computing power since the development of the Q-36 and Q-37 radars in the 1970s theoretically allows an airborne radar to distinguish a

²⁶⁸ Robert Nelson, "Q-47 Future Firefinder Radar." *Field Artillery*. (May-June 2001), 37.

²⁶⁹ Nelson, 37.

²⁷⁰ Ibid.

²⁷¹ Daniel Caldwell. "Radar Planning, Preparation, and 3-Tier Coverage: LMCR, Q-36 and Q-37." *Field Artillery*. (September – October 2004), 44.

small target from a large clutter return. IDA calculated the “backscatter coefficient” necessary to decrease the target-to-clutter ratio, and the manner that in flight GPS accuracy affected the calculations.²⁷²

In a 2005 report, the Defense Advanced Research Projects Agency (DARPA) expressed the need for “persistent global and theater surveillance... across a wide range of battlefield scenarios.”²⁷³ These endeavors were intended to assist the U.S. Air Force in finding targets.²⁷⁴ The report mentioned Firefinder radars, yet introduced the possibility that a satellite, launched into low-earth orbit, could track mortar launches in urban terrain, by scanning from above to avoid being blocked by tall buildings. Engineers calculated, “At steeper depression angles, target velocity projected to the sensor is multiplied by the cosine of the depression angle.”²⁷⁵ Launching a satellite into orbit to find the origin of an indirect fire attack is an extravagant concept. Adversaries can render this satellite obsolete by simply attaching a cheap \$12 timer to rockets launched from pipe tubes leaned against a rock. These are unnecessarily expensive attempts to counter inexpensive problems. Ultimately, the U.S. Air Force is not concerned with destroying artillery, unless it is part of an air defense system. The acquisition of indirect fire systems will continue to be conducted from the ground, even though the Air Force is increasingly called upon to destroy these targets. Regardless, the combined capabilities of the Army and Air Force in this area has proven sufficient to project ground forces into positions where they must address other concerns.

4. Analysis of Networked Sensors (SOSCOE)

The Kosovo War was followed by debates with extreme views regarding the role of air and land forces. The U.S. Army’s networked radar systems, resembling that envisioned by SOSCOE, played an important, yet mostly overlooked role in Kosovo,

²⁷² Roger Sullivan, Jeffrey Nicoll, and James Ralson. “Airborne Firefinder Radar Concept.” Abstract. Presented at the 1998 National Radar Conference at Dallas, TX (12-13 May 1998), 88.

²⁷³ Tim Clark. (Program Manager, Special Projects Office). “Tailored Tactical Surveillance.” *DARPA Tech*. (9 August 2005). At: <http://www.darpa.mil/DARPATech2005/presentations/spo/clark.pdf>. 160.

²⁷⁴ *Ibid.*, 163.

²⁷⁵ Clark, 263.

Afghanistan, and Iraq. These systems, although impressive, are not based on recent conceptions. Transfer protocols, routers, and packet switching – all part of today's Internet – were made possible by the creation of SAGE (Semi Automatic Ground Environment). This networked system of sensors, developed in the 1950s, spanned all of North America.²⁷⁶ The SOSCOE may offer significantly increased situational awareness for ground forces, but it is not a new idea. Therefore, it is important to examine past situations involving similar systems. In irregular warfare, SOSCOE's focus on situational awareness at extended ranges may degrade from situational awareness where it is actually necessary. Assuming it were possible for the U.S. Army, armed with long range strike systems, to track every human being in a theater of operations that had a hostile intention toward it, would this assist with the goal of spreading democracy?

C. INFORMATION AGE WARFARE

The original purpose of computer networking was to link sensors monitoring for a Soviet nuclear attack, and to ensure the survival of command and control systems for nuclear weapons in the event of a nuclear attack. These efforts assured that the United States had the ability to retaliate, amidst such chaotic circumstances. After the Cold War, these communications technologies offer unforeseen capabilities such as the Internet. Today, the U.S. Army is attempting to create mechanized ground forces utilizing 27-ton vehicles connected by a common network. When testifying before the U.S. Senate in 2005, Paul Francis, of the Government Accountability Office, summarized the FCS concept with the following:

The essence of the FCS concept itself -- to provide the lethality and survivability of the current heavy force with the sustainability and responsiveness of a force that weighs a fraction as much -- has the intrinsic attraction of doing more with less.²⁷⁷

²⁷⁶ Paul Edwards. *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996), 3.

²⁷⁷ Paul Francis, United States Government Accountability Office. "Future Combat System Challenges and Prospects for Success." Testimony Before the Subcommittee on Airland, Committee on Armed Services, U.S. Senate. Washington, D.C.. (16 March 2005), 6.

Regardless of the technology, a plan involving “doing more with less” is a matter of considering how much to gamble with the lives of soldiers to accomplish feats that may not be possible with existing resource allocations. It is a matter of taking ever-greater risks to even the playing field. This is the most basic aspect of maneuver warfare, as interpreted by Jomini from observing Napoleon. Doing more with less is characteristically different from doing more with more, or doing less with more, though the latter might not inspire the innovation and boldness that emerges from scarcity and desperation.

Army bases are situated in the middle of places such as Texas, Colorado, Oklahoma, and Kansas. These locations were originally intended to facilitate rapid deployment of horse cavalry to fight against various Indian tribes that no longer exist. Naturally, politicians want to keep these bases in their districts, and there are reasonable concerns over whether adequate sized training areas exist elsewhere, or if the cost of new infrastructure outweighs maintenance costs of the old. Some of the problems associated with the Army’s current rapid deployment scheme may be more a factor of these constraints rather than whether a vehicle is too heavy to fit on a C-130 or C-17. Regardless, few countries can project land forces to a hostile environment at distances the U.S. Army is currently engaged. Therefore, improving current capability in this area may not prove as relevant as addressing what happens after the forces arrive. Otherwise, there is no point in deploying forces in the first place.

The FCS is based on the idea that information obtained from sensors can allow for the remote application of violence, thereby negating the need for heavy armor protection. Although there are numerous shortcomings with such a concept, the logic itself is not flawed. The irregular warrior has already adopted this logic, evident with the Improvised Explosive Device (IED). This precision weapon system can be employed remotely, coordinated by modern information networks, and operated by personnel speaking the same language as the local population – all without having to burn a million gallons of JP-8 each day.

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V. IRREGULAR WARFARE AND BUDGET POLITICS

Congress recently expressed concern that the FCS may not provide adequate capabilities for irregular warfare, and that it is merely an incremental improvement of the Army's capabilities for traditional warfare.²⁷⁸ The 2006 *National Security Strategy* (NSS) and *Quadrennial Defense Review* (QDR) both define irregular warfare as a form of war fought by unconventional forces in which the enemy is not necessarily a state.²⁷⁹ Both documents mention that irregular warfare is currently the prevalent form of war. This definition is vague, and allows the military branches to continue planning predictable force structures with little constraint. A special study on irregular warfare by the U.S. Joint Forces Command concludes that it should "reject addressing irregular warfare as a term or construct in joint doctrine" since its definition is unclear in the *National Security Strategy* and the *National Military Strategic Plan for the War on Terrorism* and therefore not to include it in the *Department of Defense Dictionary of Military and Associated Terms* or any other joint publications.²⁸⁰ The study goes on to conclude that older terms such as Unconventional Warfare, Stability Operations, Civil-Military Operations, and Counterinsurgency should continue to be used instead. The inability to agree on a definition for a form of warfare that does not fit into "traditional" ways of thinking is illustrative of a military bureaucracy that has been conditioned by the Cold War. The QDR describes traditional warfare as "familiar," while irregular warfare is described as "prevalent." This language implies that the military is unfamiliar with prevalent trends in warfare and should quickly become familiar. The FCS program is the Army's attempt to address new trends in warfare.²⁸¹

²⁷⁸ Andrew Feickert. "The Army's Future Combat System: Background and Issues for Congress." *CRS Report for Congress*. (11 October 2007), 14.

²⁷⁹ Donald Rumsfeld. *Quadrennial Defense Review Report*. United States Department of Defense. (February 2006), 3; Also: *National Security Strategy* 44.

²⁸⁰ United States Joint Forces Command. *Irregular Warfare Special Study* (4 August 2006). At: <http://merln.ndu.edu/archive/DigitalCollections/IrregWarfareSpecialStudy.pdf>, 5-6. The current motto of this institution is, "Leading the way in Transformation."

²⁸¹ Although the program began in 1999, prior to the publication of the recent QDR and NSS, the Army believes that the FCS is ideal for irregular warfare.

A. FINDING KING ARTHUR'S SWORD

This chapter assesses the capabilities of FCS weapon systems in irregular warfare, given the context of budget politics. Weapon systems will be examined in relation to the branch of the Army they are associated with. Army doctrine is based on “combined arms warfare.” The U.S. Army uses this term to refer to a combination of tanks, artillery, helicopters, and mechanized infantry, in an attempt to emphasize “teamwork” while simultaneously serving as a bureaucratic political tool to equalize the lobbying power of each branch. The FCS is referred to as a “system of systems” in the latest continuation of the notion of “combined arms,” which also has been referred to as the “modern system” of force employment.²⁸² The only feasible solution to a problem (irregular warfare) faced by a bureaucratic institution, such as the Army, is to bestow equal monetary blessings to all competing subdivisions of the institution during a period of reform.

To explain how bureaucratic politics influences the outcome of political decisions, Graham Allison introduced the proposition, “Where you stand depends on where you sit.”²⁸³ This proposition fits well with the Army’s internal power sharing mechanisms as well as its budget competition with other services. The head of each branch of the Army is referred to as a “Chief,” and in this role, they each promote the interests of their branch. Naturally, the artillery branch wants new guns, the aviation branch wants new helicopters, and the armor branch claims that everyone would be safer in an armored vehicle. This is no different from the behavior of the Air Force, which claims it needs more fighter aircraft; and the Navy, which claims it needs more aircraft carriers and new battleships. This sort of “joint” transformation pays lip service to irregular warfare by claiming that new tanks (FCS), battleships (Littoral Combat Ship, LCS), and aircraft (F-22 Raptor) are ideal for fighting terrorists. The most startling example of this trend is evident with the National Laboratories, which have proposed new

²⁸² Stephen Biddle. *Military Power: Explaining Victory and Defeat in Modern Warfare*. (Princeton, NJ: Princeton University Press, 2004).

²⁸³ Graham Allison. “Conceptual Models and the Cuban Missile Crisis.” *American Foreign Policy*. ed. G. John Ikenberry (New York: Harper Collins Publishers, 1989), 363.

nuclear weapons, such as the Robust Nuclear Earth Penetrator (RNEP), as a way of dealing with terrorists hiding stockpiles of nuclear, biological, or chemical weapons underground.²⁸⁴

The artillery and aviation branches are based exclusively on technological advances, while infantry is as old as warfare itself, and armor is based upon mounted warfare and the traditions of horse cavalry. The artillery and aviation branches have promoted some of the most expensive weapon systems in recent times, such as the Crusader and Comanche helicopter.²⁸⁵ Infantry is usually the final bastion of tradition in any military institution, since it is based on a form of fighting that has proven relatively difficult to leverage or “transform” with new technology. Therefore, the armor branch has taken on the role of lobbying for the infantry branch. The recent Base Realignment and Closing (BRAC) Commission mandated a merger between the armor and infantry branch, which will take effect by 2012, creating a “maneuver branch,” which will consolidate training functions performed by the armor and infantry schools at Fort Benning, Georgia.²⁸⁶

In recent times, the two most influential branches inside the Army, from an equipment and doctrinal perspective, are the artillery and armor branches. Manpower constraints (internally perceived) and technological fanaticism have caused the Army to rely on long-range strike systems and armor protection to a degree that inhibits the

²⁸⁴ Charles P. Blair and Jean P. du Preez. “Visions of Fission: The Demise of Nuclear Negative Security Assurances on the Bush Administrations Pentomic Battlefield.” *The Nonproliferation Review*. Vol. 12, No. 1 (March 2005), 45.

²⁸⁵ Andrew Bacevich. *The New American Militarism*. (New York: Oxford University Press, 2005), 216.

²⁸⁶ Timothy Reese and Aubrey Henley “A Modest Proposal to do away with the Armor Branch.” *Armor*. (September-October 2005). This title was based upon Jonathan Swift's 1729 literary essay, “A Modest Proposal for Preventing the Children of Poor People in Ireland from Being a Burthen to Their Parents, or Country, and for Making them Beneficial to the Public.” Swift’s essay argued that poor children could become beneficial to society by eating them. COL Timothy Reese is an armor officer, while Aubrey Henley was the director of the Office of the Chief of Armor at the time. Their proposal served as a way of saving the Armor Branch by the metaphorical equivalent of “eating” it. Moving the Armor Branch to Fort Benning and making it the “Maneuver Branch” is a clever bureaucratic technique that will increase its influence over both armor and infantry functions. The BRAC commission did not realize this.

institution's ability to address irregular warfare.²⁸⁷ The merger of the armor and infantry branches is mirrored with the merger of field artillery and air defense artillery branches to create a "fires branch." This consolidation occurred in 2007 at Fort Sill, Oklahoma.

The first components of the Future Combat System scheduled for production are intended for the Army's Field Artillery Branch, which earned the nickname "King of Battle" during World War I. Much like the King Arthur of legend, the Field Artillery Branch must find its Excalibur in order to be "King of Battle" in the information age. Prior to the Future Combat System, the Army's last major weapons program on the defense budget was the "Crusader" artillery system.²⁸⁸ Crusader was meant to replace the aging "Paladin." Despite mechanical upgrades, computers, and the ability to receive digital fire missions, the final act in firing the Paladin's 155mm cannon involves pulling a string. Prior to this act, soldiers must hand-load the shell, fuse, and several powder bags. In contrast, the FCS Non-Line-of-Sight Cannon (NLOS-C) has an auto-loading ammunition cylinder and push-button firing mechanism. This reflects the institution's perception of the information age, whereby wars are not won by pulling strings, but instead by pushing buttons, with labor-intensive tasks performed using mechanization. While these measures may increase the capacity to shoot artillery rounds, they are not necessarily relevant for irregular warfare.

Former Secretary of Defense Donald Rumsfeld argued that Crusader was too expensive and a relic of the Cold War. He cancelled the Crusader program in 2002, stating, "While a technological advancement over the Paladin howitzer, it was conceived for a traditional, mass force counterattack role."²⁸⁹ Additionally, in a testimony before the Senate Armed Forces Committee, he stated:

In short, the decision to recommend that we skip Crusader is one that emphasizes accelerating the shift to precision munitions of all indirect fire

²⁸⁷ Additionally, increasing the number of infantrymen does not provide the same benefit to various Congressional districts as increasing the number of weapon systems that would potentially be produced in Congressional districts throughout the country. This phenomenon was evident when Congress provided funds for more Mine Resistance Armored Vehicles than the Army and Marines believed necessary.

²⁸⁸ Crusader and Comanche, though conceived prior to the Future Combat System, were intended to become part of the system prior to being cut from the budget.

²⁸⁹ Donald Rumsfeld, "Prepared Statement on the Crusader Recommendation before the Senate Committee on Armed Services." (16 May 2002), 12.

systems—cannon as well as rocket, Marine Corps as well as Army. Our recommendation is not to abandon the technologies already developed by the Crusader program. In fact, it would ensure that the key pieces of Crusader technology are maintained for use in both the Army's Future Combat System, and possibly in the advanced gun system the Navy is developing for its future surface combatants.²⁹⁰

This statement served to alleviate concerns of various Senators representing states where Crusader was to be manufactured. Fierce criticism of Rumsfeld's decision came from Oklahoma Senator James Inhofe.²⁹¹ He argued that Rumsfeld's estimates on the number of C-17s required to deploy the Crusader were too high because they included the weight of ammunition.²⁹² Coincidentally, Fort Sill, Oklahoma is the home of the Field Artillery Branch. A civilian official working for the Army was later fired for providing talking points on Crusader to supporters in Congress.²⁹³ Rumsfeld's suggestive linkage of the Army's weapons to the Navy's new Littoral Combat Ship served to expand Congressional interest while mitigating criticisms of transformation.²⁹⁴ Although Crusader was cancelled, the Non-Line-of-Sight Launch System (NLOS-LS) and NLOS-C have taken its place. These systems will increase the Army's indirect firepower capability in terms of quantity, range, and precision. This renewed effort, with an emphasis on precision, has salvaged the spirit of Crusader in the form of Excalibur.

B. EXCALIBUR (XM982)

Although the new NLOS-C artillery vehicle does not yet have a name associated with Arthurian legend, it will fire the 155mm Excalibur (XM982) artillery round. Excalibur is the only component of the FCS that has been assigned a real name in addition to some typical form of descriptive acronym and military nomenclature (usually

²⁹⁰ Rumsfeld, "Crusader Recommendation." 11.

²⁹¹ Terrence Smith. "Scrapping Crusader." *Online News Hour* (16 May 2002) At: http://www.pbs.org/newshour/bb/military/jan-june02/crusader_5-16.html. Accessed on 10 Jan 08.

²⁹² Ibid.

²⁹³ Ibid.

²⁹⁴ By linking FCS to LCS, Rumsfeld secured support for "transformation" from Congressional districts that supported shipbuilding as well as artillery systems manufacturing.

a combination of letters and numbers).²⁹⁵ Like the mythical weapon system employed by King Arthur, the new Excalibur artillery round also strikes with a three to nine meter accuracy.²⁹⁶ When fired at a high arc, Excalibur comes crashing almost vertically from the sky to strike a target in urban terrain without being blocked by tall buildings. Like the Air Force's JDAM (Joint Direct Attack Munition), this round can also be guided by the Global Positioning System to ensure accuracy. This is an improvement upon the capability of Copperhead artillery rounds that required continuous lasing of a target by exposed ground personnel. It is merely an incremental improvement on existing Army technologies, however, and it does not provide increased capability in irregular warfare. The Air Force B-52 Stratofortress, with a payload of JDAMs, can provide a similar capability with global range, though proponents of artillery make the point that aircraft cannot provide timely, sustained, and organic fire support.²⁹⁷ The new Excalibur round can be fired from existing artillery systems as well as new FCS artillery vehicles. The existing artillery systems that can fire Excalibur, however, were designed before Vietnam. Although the age of the artillery tubes or aircraft delivering various munitions does not make a difference from a tactical standpoint, it is central to bureaucratic arguments for new weapon systems.

C. ARTILLERY SYSTEMS AND PERSONNEL AT THE BRIGADE AND DIVISION LEVEL

The U.S. Army has sharply increased its reliance on indirect fire systems during the past three decades in terms of quantity, range, and precision. Although attritional warfare and artillery barrages did not bring success in Vietnam, the momentum of these efforts continued after Vietnam as the Army placed renewed emphasis on the mission of defending Western Europe. In contrast to the Abrams and Bradley, current artillery systems are much older. Therefore, FCS vehicles intended to replace artillery systems

²⁹⁵ The names assigned to weapon systems illustrate the underlying focus of an institution. For example, the Air Force's only plane purposefully designed for providing close air support for the Army is named "Warthog" (A-10) while other aircraft such as the "Eagle" (F-15) and "Falcon" (F-16) are named after majestic birds. Interestingly, the F-22 "Raptor" is named after an extinct dinosaur.

²⁹⁶ Tommy James Tracy. "Field Artillery at the Crossroads of Transformation." *Military Review*. (January 2004), 33.

²⁹⁷ The term "organic" refers to a unit having operational ownership and control over an asset.

are first in the order of production, while those intended to replace the Abrams and Bradley will be produced last.²⁹⁸ The field artillery branch was passed over and left “pulling strings” (both literally and in the figurative political sense) in the aftermath of the 1980s acquisition of the “Big Five” weapons systems, which did not include a new artillery piece. The artillery branch continued to depend on systems such as Paladin, designed in the early 1960s. Nevertheless, the amount of artillery assigned to units increased in the past three decades. As the Army acquired new tanks and helicopters, proponents of the Field Artillery Branch desperately pointed out the longer ranges of Soviet-designed artillery systems, including those used by Iraq in 1991 and 2003.²⁹⁹

After Vietnam, the Army increased the number of artillery tubes in a division from fifty-four to ninety-six, an 80% increase.³⁰⁰ While this may have been a relevant measure against the threat of the Warsaw Pact, it is unclear why the Army is increasing the number of artillery systems once again. The current force has thirty artillery pieces at the brigade level.³⁰¹ The proposed Future Combat System brigade will have forty-two vehicle-based artillery systems plus sixty unmanned missile systems.³⁰² This is a 340% increase in artillery, rocket, and mortar systems at the brigade level.

²⁹⁸ However, the vehicles will all share a common chassis.

²⁹⁹ Tommy James Tracy, 37. Additionally, North Korean artillery has longer ranges. However, many of the higher range estimates are based on towed tubes that are not self propelled.

³⁰⁰ Boyd L. Dastrup. *King of Battle: A History of the U.S. Army's Field Artillery Branch*. (Fort Monroe: Office of the Command Historian of the United States Army Training and Doctrine Command, 1992), 298.

³⁰¹ This estimate includes mortar vehicles as well as howitzers. Mortars do not belong to the FA branch, but they are considered here in the same category of indirect fire weapons.

³⁰² This includes the NLOS-LS as well as mortars. Typically, mortars are considered as equipment belonging to maneuver elements such as armor or infantry. In this analysis, they are considered by function, rather than where they fall on tables of organization.

Table 2-4.**FCS Replacements for Armored Vehicles in the Army's Modular Heavy Combat Brigades**

Vehicle Mission	Vehicles in the Current Fleet		Manned FCS Vehicles	
	Name	Number	Name	Number
Combat	Abrams tank	58	Mounted combat system	60
Infantry Carrier	Bradley fighting vehicle	80	Infantry carrier vehicle	102
	M113-based vehicle	53	n.a.	n.a.
Mortar Carrier	M113-based vehicle	14	Non-line-of-sight mortar	24
Artillery	M109 self-propelled howitzer	16	Non-line-of-sight cannon	18
Scouting	Bradley fighting vehicle	40	Reconnaissance and surveillance vehicle	30
Command and Control	M113-based vehicle	44	Command-and-control vehicle	49
Medical	n.a.	n.a.	Medical vehicle	29
Recovery	M88 recovery vehicle	27	Recovery and maintenance vehicle	10
Total		332		322

Source: Congressional Budget Office based on Office of the Secretary of Defense, *Future Combat Systems: Selected Acquisition Report* (December 31, 2005); and data from the Department of the Army.

Table 2: FCS Replacements for Current Vehicles (From CRS)

The goal of Army Transformation is to "shift weight" from Cold War legacy weapon systems, yet the institution still devotes significant resources to traditional weapon systems at the cost of reducing the number of assets devoted to irregular warfare. The emphasis on long-range firepower is misplaced, considering the short range at which forces might engage the enemy in irregular warfare. Many observers have noted that after multiple deployments to Iraq, Army units have successfully adopted counterinsurgency methods. This is not because units are enabled by new equipment or weapons. Instead, it is because units are finding new ways of employing or disregarding their traditional resources. The disregard of tradition is evident in the manner that field artillery personnel are currently being employed.

Over half of all field artillery captains graduating from the career course at Ft. Sill will move to assignments as military advisors in Iraq rather than as artillery battery commanders, due to the increased need for advisors and decreased need for artillery barrages in irregular warfare. As a new generation of traditional weapon systems becomes available, however, these personnel assignment changes will most likely be temporary. A young field artillery captain recently captured this idea when saying the following: "I became an officer to be a commander; now I'm going to have to wait longer.

The (military advisor) teams are taking us from our traditional roles as artillerymen."³⁰³ However, remote systems such as the NLOS-LS do not require “command” in the traditional sense. For this reason, manned systems such as Crusader have been resurrected in the form of the NLOS Cannon, a vehicle based artillery system scheduled to be the first FCS vehicle in production.

Army Transformation is based on the idea that capability across the “full-spectrum” of conflict is a matter of applying varying doses of firepower. Low-intensity conflict is viewed as something that can be addressed by delivering a small, precise volume of firepower, while high-intensity conflict is a matter of delivering larger volumes of firepower with less regard for accuracy. This is a flawed perception. Addressing the political aspects warfare, whether traditional or irregular, is not simply a matter of shooting various types of artillery rounds or maneuvering armored vehicles into certain positions. Political problems cannot be reduced to engineering problems.

Eleven of the fourteen FCS components are designed to deliver long-range fires, resupply munitions, or assist in the targeting process. Unmanned robot logistics vehicles and air-droppable ammunition cylinders are intended to resupply the artillery. The only manned ground vehicles not associated with either managing or delivering some form of long-range firepower are the medical vehicle, recovery and maintenance vehicle, and infantry carrier (although it will have a 30mm cannon for direct fire engagements). The chart below illustrates the distribution of these systems in a brigade:

³⁰³ Ann Scott Tyson. “Military Training Units Seen as Career Detours.” *Washington Post*. (25 October 2007).

Table 3-1.

**Planned New Components for an
FCS-Equipped Brigade**

	Quantity ^a
Manned Systems	
Mounted Combat System	60
Infantry Carrier Vehicle	102
Command-and-Control Vehicle	49
Reconnaissance and Surveillance Vehicle	30
Non-Line-of-Sight Mortar	24
Non-Line-of-Sight Cannon	18
Medical Vehicle	29
Recovery and Maintenance Vehicle	10
Unmanned Ground Vehicles	
Armed Robotic Vehicle-Assault	18
Armed Robotic Vehicle-Reconnaissance, Surveillance, and Target Acquisition	27
Armed Robotic Vehicle-Assault (Light)	18
Multifunctional Utility, Logistics, and Equipment Vehicle	90
Small Unmanned Ground Vehicle	81
Unmanned Aerial Vehicles (Launch and Control Units/Aircraft)	
Class I	54/108
Class II	36/36
Class III	12/48
Class IVa	2/8
Class IVb	8/16
Other	
Unattended Ground Sensors	136
Non-Line-of-Sight Launch System	60
Intelligent Munitions System	30 or 88 ^b

Source: Congressional Budget Office based on Office of the Secretary of Defense, *Future Combat Systems: Selected Acquisition Report* (December 31, 2005).

Note: FCS = Future Combat Systems.

- a. Does not include equipment for training or for replacing vehicles that are removed from units for repairs or upgrades or that are lost in accidents or in combat.
- b. The Army has not yet determined whether each brigade will have 30 or 88 intelligent munitions systems.

Table 3: Planned FCS Components in Brigade Combat Team (From CRS)

A 2007 issue of *Field Artillery* features articles entitled, “Cultural Awareness,” and “What the hell is an NGO?”³⁰⁴ These types of topics are published in the professional journal of the artillery branch to meet the needs artillerymen who are struggling to grasp irregular warfare. Other articles offer guidance on how to transform Paladin batteries into maneuver units that conduct police functions. These are the types of tasks currently conducted by deployed artillery units. Additionally, forward observers attached to maneuver units typically perform civil affairs functions rather facilitating fire support. These developments have sparked concern among many in the branch over the future role of artillery.

The annual “state of the field artillery” issue of *Field Artillery* alleviates concerns about the future of artillery. In this issue, the Chief of the Artillery points out the myriad of roles played by artillerymen, “We have acted as Infantrymen, Military Policemen and transporters and conducted hurricane disaster relief.”³⁰⁵ He goes on to say, “If we’re not careful, we could end up with a generation of FA Soldiers who lack proficiency and experience in providing fire support to the ground commander.”³⁰⁶ These legitimate concerns capture the problem of facing irregular warfare while simultaneously maintaining traditional warfare skills. To address this problem, the artillery branch has pinned its hopes on the belief that new precision artillery and rocket systems will suffice to address irregular warfare through traditional skills. General Martin Dempsey, former commander of 1st Armored Division, is quoted in *Field Artillery* saying, “the current employment of the FA in non-FA tasks in Afghanistan and Iraq will not always be the rule.”³⁰⁷ He goes on to say, “maintain your ability to provide full-spectrum fires.”³⁰⁸ This reinforces the notion that the traditional tasks associated with firing artillery rounds will continue to be relevant across the “full-spectrum” once new types of artillery rounds are developed.

³⁰⁴ *Field Artillery*. (January-February 2004).

³⁰⁵ David Ralston. “State of the Field Artillery.” *Field Artillery*. (November-December 2006), 2.

³⁰⁶ *Ibid*.

³⁰⁷ Mark Brock. “The Field Artillery is Alive and Well: In Fact Thriving.” *Field Artillery*. (July 2006), 21.

³⁰⁸ *Ibid*.

The Future Combat System's NLOS-LS (Non-Line of Sight Launch System) component began as the idea to have fifteen “rockets in a box” that could be dropped by a C-130 or put on the back of a truck, and left unattended, capable of precision fires anywhere within a 200-kilometer radius, with a capability to loiter and “hunt” for 45 minutes.³⁰⁹ Based on these capabilities, an entire armored brigade worth of tanks can be destroyed in less than one hour with four boxes of rockets working in conjunction with remote sensors in open terrain, given a traditional warfare scenario. In irregular warfare, the current employment of rocket systems is suggestive of the manner in which systems such as the NLOS-LS might be employed.

The Army’s current rocket artillery system is the Multiple Launch Rocket System (MLRS). A new GPS guided rocket for this system completed “testing” in Ramadi in 2007.³¹⁰ In irregular warfare, the MLRS is deployed as a stand-alone system rather than as part of a larger battery organization. The GMLRS (Guided Multiple-Launch Rocket System) Unitary proved to be the “weapon of choice” in Ramadi during 2007.³¹¹ An article written by officers employing the weapon in Ramadi mentions the lower risk estimate distances (REDs) and collateral damage estimates (CDEs) of the new GMLRS precision munitions in comparison to the JDAM.³¹² This capability allowed the munitions to destroy specific buildings without damaging nearby buildings. While it may seem relevant, destroying buildings tends to enrage large portions of population, whether on Wall Street in New York or Haifa Street in Baghdad.³¹³ Proponents argue that such systems are necessary to provide fire support. Although the need for fire support is a relevant concern, new capabilities have the potential to increase casualty averse behavior, by creating the opportunity to expend enormous firepower to save lives.

³⁰⁹ “Non-Line-of-Sight Launch System (NLOS-LS),” At: <http://www.globalsecurity.org/military/systems/munitions/net-fires.htm>. Accessed on 15 Nov 07.

³¹⁰ Andrew Lantz and Paul Weyrauch. “GMLRS Unitary Battle Drill and the Ready First Combat Team.” *Field Artillery*. (March-April 2007), 35. The article contains of photograph of the rocket impacting a building in Ramadi with caption stating that this was the “testing,” and that the rocket did not destroy nearby buildings in the photograph.

³¹¹ *Ibid.*, 35.

³¹² *Ibid.*

³¹³ Numerous abandoned buildings in Iraq that were once part of Saddam’s military industrial complex are now inhabited by homeless Iraqis.

Fire support for “troops in contact” (TIC) is the highest tactical priority for aircraft and artillery systems.³¹⁴ As troops become exposed to more danger, attempting to increase presence to better “secure the population,” this causes an increase in the use of indirect fire, and has spurred a competition between artillery assets and aircraft in order to prove their relevance, at the expense of making the Iraqi population less safe from collateral damage. This inter-service rivalry was evident during 2007, as the Army surged combat power and adopted new tactics. In response to the Army’s actions, Air Force General Charles Dunlap stated, “Unfortunately, starry-eyed enthusiasts have misread the (counterinsurgency) manual to say that defeating an insurgency is all about winning hearts and minds with teams of anthropologists, propagandists and civil-affairs officers armed with democracy-in-a-box kits and volleyball nets.”³¹⁵ He argued that the “fivefold increase in airstrikes during 2007 as compared with the previous year,” as a result of the surge, “proved to be highly successful” in suppressing the level of violence in Iraq.³¹⁶

The struggle for relevance in providing fire support is evident from the Army perspective in a *Military Review* article that highlights how the Russians used ground based artillery rather than air power to destroy “terrorist targets” in over 70% of indirect fire engagements during the second Chechnya War.³¹⁷ This point is used to highlight the need for more artillery rather than aircraft in U.S. efforts to fight terrorists. Regardless of which view prevails, there is one certainty: in learning how to fight against the Russians in “traditional warfare,” the United States has learned how to fight like them in “irregular warfare.”

³¹⁴ In the aftermath of major combat operations, this becomes the only purpose for such systems, as they are otherwise idle.

³¹⁵ Charles Dunlap. “We Still Need the Big Guns.” *New York Times*. (9 January 2008).

³¹⁶ Ibid.

³¹⁷ Tommy Tracy. “Field Artillery at the Crossroads of Transformation.” *Military Review*. (January-February 2004). 33.

D. FINISHING DECISIVELY: THE COMBAT ARM OF DECISION

The traditions of horse cavalry continue in the Armor Branch.³¹⁸ In the 19th Century, cavalry units believed their role was to “crown victory” using “cold steel” while mounted on horses.³¹⁹ Today, tankers believe their role is to “finish decisively” by closing with the enemy using armor protection, shock effect, and a large cannon employed in a direct-fire manner. Saber drill has been replaced with tank gunnery, while horse grooming has been replaced with track lubrication. Victory in irregular warfare cannot be “crowned” while “mounted,” whether on horses, tanks, aircraft, or even aircraft carriers.

The Mounted Combat System (MCS) is the next generation of tank, intended to replace the Abrams tank in the modular brigade structure. The estimated cruising range of the MCS is 300 kilometers, while that of the Abrams tank is 440 kilometers.³²⁰ The proposed MCS has a main gun that is capable of destroying enemy armor at ranges up to eight kilometers. This is twice as far as the range of the current Abrams tank. While the ability to destroy enemy tanks spotted by sensors at ranges of eight kilometers is an improvement over the Abrams, the ability to fight at short-ranges is degraded. In contrast to the Abram tank’s three machine guns, the MCS design has only one machine gun.³²¹ Experience in the low end of the spectrum of conflict, particularly when fighting an urban insurgency, calls for greater firepower at short ranges.³²² The machine gun intended for the MCS is the M2 Browning (.50 caliber). Although still reliable, it was originally designed during World War I.³²³

³¹⁸ These traditions also continued with the development of aircraft.

³¹⁹ Edward Katzenbach. “The Horse Cavalry in the 20th Century.” *Public Policy*. (1958), 120-149.

³²⁰ Francis M. Lussier, “The Army’s Future Combat Systems Program and Alternatives.” Congressional Budget Office. (August 2006), 22. This is because weight restrictions call for a smaller fuel tank.

³²¹ *Ibid.*, 22.

³²² James E. Gaylord. *The Mounted Combat System: Not Your Current Full Spectrum Armor Force*. CGSC School of Advanced Military Studies, Fort Leavenworth, KS, 2004.

³²³ The Navy’s Phalanx MK 15 Close-In-Weapon-System (CIWS) is a 20mm electronically guided gatling gun, capable of being remotely controlled by the Aegis battle management system. This capability for short range firepower far exceeds current machine guns that the Army employs on vehicles. If the Navy’s “Phalanx” were employed by ground forces, it might offer a tactical advantage to infantry equivalent to the ancient Macedonian phalanx.

Modular heavy brigades are composed of 58 Abrams tanks, while the proposed FCS brigade will be composed of 60 Mounted Combat Systems. Currently, the majority of deployed Abrams tank companies operate as motorized infantry in Humvees. The expertise in maneuvering tanks allows for a smooth transition in the tactics necessary with other types of vehicles operating over large areas of terrain. However, the skills and manpower necessary for successful dismounted infantry operations is lacking among tankers, who are accustomed to elaborate crew drills and extensive maintenance, rather than moving on foot, clearing rooms, and expert rifle marksmanship. These problems will be multiplied in the proposed MCS units because they will have half as many troops as current tank units. This reduction in manpower is based on an autoloader design, and the expectation for smaller tank crews (2 people) to perform more tasks. These tasks include driving, gunning, commanding, navigation, communications, maintenance, and control of UAVs. Many of these tasks tend to focus the crew on possible threats at long ranges by tracking objects on a screen. This is problematic if fighting in an environment where the enemy may be standing next to the tank.³²⁴

In a 2007 issue of *Armor*, the professional journal of the armor branch, CPT Irvin Oliver noted that while his company did well in counterinsurgency operations, it came at the expense of “skill shortfalls” in the areas of “boresighting, gunning, platoon maneuver— in short, ‘tanking.’”³²⁵ He goes on to say, “we have ultimately focused on short-term combat operations in Iraq at the expense of long-term technical competency.”³²⁶ This illustrates the attitude that irregular warfare is a temporary distraction from the pursuit of traditional warfare capabilities. The same issue of *Armor* magazine, however, features articles on: the fundamentals of room clearing, cavalry scouts conducting reconstruction in Afghanistan, an Abrams platoon operating from humvees in Tal Afar, Iraq, and an article entitled, “Governance Development.”³²⁷ These are all examples of non-traditional missions performed in irregular warfare. Some of the

³²⁴ It would be even more problematic if the enemy was observing the tank at night based on the glow coming from screens inside, if the hatches are open.

³²⁵ Irwin Oliver. “Letters to the Editor.” *Armor*. (May-June 2007), 1.

³²⁶ Ibid.

³²⁷ Ibid.

tasks associated with “tanking” may be relevant in order to provide support for troops in contact in an urban environment. However, armor battalions currently reserve this emergency role for only one or two platoons of tanks, while utilizing humvees throughout the rest of the unit.³²⁸

The Abrams tank was not designed for urban combat. It offers a level of protection, however, that allows its crews to venture where dismounted infantrymen dare not move while under fire in an urban setting. In any case, few recent articles focus on traditional tank operations in *Armor*, since such topics are not currently in demand.³²⁹ Although tanks may not be the most relevant weapon system in irregular warfare, they may be useful in limited numbers to support dismounted infantry in hostile urban environments. The larger issue revolves around how to best maintain a large capital investment in equipment and specific skill sets, given a limited amount of personnel, while simultaneously performing a new set of tasks.

Many of the weapon systems designed for the Cold War can be relevant in irregular warfare, if employed in a different manner. Nevertheless, the main contribution of such systems is in the acquisition and destruction of targets. This capability is important for brief, dangerous periods. In the long-term, such capabilities cannot be used to create stable, democratic governments. Tanks can operate over a large area, and provide short-term dominance in an urban environment. In the long term, light infantry units are necessary to dominate discreet pieces of urban terrain. The Army is attempting to combine these capabilities in an effort to bridge a perceived “gap,” based on the assumption that this will lead to success in irregular warfare. Ultimately, this effort serves as evolutionary progress towards the same modernization objectives of the Cold War era.

³²⁸ John DeRosa. “Platoons of Action: An Armor Task Force’s Response to Full-Spectrum Operations in Iraq.” *Armor*. (November-December 2005), 9.

³²⁹ In this case, traditional ‘tanking’ refers to tasks such as bore-sighting, muzzle reference system updates, and inputting barometric pressure into a ballistic computer. These tasks are associated with long-range precision gunnery involving tank-on-tank scenarios.

E. MODULARITY: ORGANIZING THE NEW LEGION

In 1997, Douglas Macgregor proposed a new unit organization for the Army in an influential book, *Breaking the Phalanx: A New Design for Landpower in the 21st Century*.³³⁰ Macgregor argued that new technology alone cannot unleash revolutionary potential unless it is incorporated into a smaller unit structure. He based this argument on the defeat of the Macedonian phalanx by the “agile” Roman Legions in 200 B.C.³³¹ He argues that Roman Legions with 5,000 troops defeated the larger 10,000 man Greek Phalanxes due to “superior organization,” and without any significant technological advantage.³³² This example was used to propose that the Army should reorganize its divisions into “combat groups” with around 5,000 troops each, as opposed to the larger 11,000 to 18,000 strong division structure.³³³ Macgregor’s proposal was based on the idea that the larger division structure consumed too many personnel by having multiple levels of command structure. Additionally, the Army was already stationing and deploying brigades separate from their division headquarters. Many elements of Macgregor’s suggestion are evident in the new modular brigade reorganization, which was initiated with the 3rd Infantry Division in 2004. “Modularity” is an effort to increase the combat power of the Army by increasing the number of brigades in each division, and altering their composition in order to incorporate FCS technologies. This reorganization is based on the idea that “the Army doesn’t need more headquarters staff; it needs more maneuver elements.”³³⁴

In *Breaking the Phalanx*, Macgregor claimed, “the arrival of the Roman Legion on foreign soil was synonymous with the presence of order, stability, and civilization.”³³⁵

³³⁰ Douglas Macgregor. *Breaking the Phalanx: A New Design for Landpower in the 21st Century*. (Westport, CT: Praeger, 1997). At the time Colonel Macgregor was an active duty armor officer. He has since retired and become a critic of FCS.

³³¹ Ibid., 1.

³³² Ibid.

³³³ Ibid., 75-86.

³³⁴ Gary Sheftick. “Army to Reset into Modular Brigade-Centric Force.” *Army News Service*. (24 February 2004). At: <http://www.globalsecurity.org/military/library/news/2004/02/mil-040224-usa01.htm>. Accessed on 10 Jan 08.

³³⁵ Macgregor, *Breaking the Phalanx*. 2.

This interpretation of history lacks a description of the actions that take place between “arrival” of the legions and “stability,” and is reflective of a gap in the focus of Army officers. This gap is further evident in a chapter of the book entitled, “Fighting with the Information Age Army in the Year 2003.” In this fictional scenario, the proposed “combat groups” are used to invade Iraq and Iran in order to destroy weapons of mass destruction and install “legitimate government and stability” in the region. In the fictional scenario, Saddam Hussein is killed, and a “friendly government” is installed in Baghdad with “moderate public reaction” only a few weeks after the invasion.³³⁶

As a result of his expertise, Macgregor served as an advisor to the Department of Defense during planning for the Iraq invasion, and supported Rumsfeld’s vision of using fewer troops, in opposition to Shinseki’s demand for more troops.³³⁷ Unfortunately, stability and order does not instantly appear upon the arrival of the U.S. Army’s new modular brigades to foreign soil, so something must be missing in the historical analysis of the Roman Legions. Just as the pants worn by troops indicate the focus of the Army, the historical basis for the Army’s reorganization indicates the direction of American foreign policy. Ironically, Macgregor is critic of the FCS, despite the fact that his book influenced a reorganization of the Army.³³⁸

Removing humans from delicate tasks that traditionally involve human interaction is likely to be counterproductive. The Army’s attempt to reduce personnel through automation, and perform violence in a more distant, indirect manner mirrors the current trend in many large corporations, which are also attempting to service customers and deliver products using automated systems, fewer personnel, and outsourcing. Both efforts have enraged and isolated large portions of population, whether domestic or foreign, while on “hold” with computerized customer service, or when being bombed by automated “precision” weapons.

³³⁶ Macgregor, *Breaking the Phalanx*, 298.

³³⁷ Douglas Macgregor. (interview) “Rumsfeld’s War.” *Frontline*. (26 October 2004). At: <http://www.pbs.org/wgbh/pages/frontline/shows/pentagon/interviews/macgregor.html>. Accessed on 10 Jan 08.

³³⁸ Douglas Macgregor. “Army Transformation: Implications for the Future.” Testimony before the House Armed Services Committee. (15 July 2004) Room 2118 of the Rayburn House Office Building. Macgregor has testified before Congress, presenting the case for a less expensive transformation.

FCS equipment is largely designed to enhance survivability, by using networked communications, long-range strike, and providing mechanization for the entire Army. While “staying alive” might be a successful strategy when defending from an attack, it is not a strategy that is likely to lead to victory for an invading force. This is true regardless of the technological aspects of warfare. This does not imply that expending more blood will bring success. Instead, a successful outcome in the aftermath an invasion can only be attained through control of population and territory. This highly political process entails more than new armored vehicles or artillery pieces can provide.

If the United States wishes to control foreign populations (control of population is necessary for success according to the new *Counterinsurgency* manual), it cannot do this with new bombs, missiles, vehicles, and artillery. Army officers, particularly those in the infantry, typically use the following quote when making some point about the futility of new technology or other branches of service:

You can fly over a land forever; you may bomb it, atomize it, pulverize it and wipe it clean of life but if you desire to defend it, protect it, and keep it for civilization you must do this on the ground, the way the Roman Legions did, by putting your young men into the mud.³³⁹

This statement has an element of truth and appeals to the traditions of the infantry branch.³⁴⁰ It is an inaccurate depiction, however, of how Roman Legions dominated populations. Putting young men in the mud only serves to get them unnecessarily dirty.³⁴¹ The Romans performed numerous administrative feats to control populations, such as conducting a census.³⁴² The U.S. Army must make a priority of getting an accurate account of the populations it is assigned to control to be successful in such a mission. Information technologies and data management systems have certainly advanced since the time of the Roman Empire. The U.S. Army is using these

³³⁹ T. R. Fehrenbach, *This Kind of War*. (Dulles, VA: Potomac Books, 50th Anniversary Edition, 2001).

³⁴⁰ The fact that so many infantrymen quote this statement fits with the proposition, “Where you stand depends on where you sit.” As a branch of the Army not based exclusively on technology, the traditions of the infantry are linked to the mud.

³⁴¹ This would also undermine efforts to maintain “clean appearance” with the new uniform.

³⁴² The word *census* originates from this Roman practice.

technologies in the pursuit of better aim and management of artillery and rocket systems rather than more useful purposes in irregular warfare. Tracking personnel and maintaining order in busy urban environments is a difficult task, but there are lessons that can be learned from large police organizations such as the New York Police Department. Simple tasks such as indentifying the registration information for a foreign vehicle based on its license plate number (using a laptop database or making a radio call) cannot be adequately performed by soldiers in Iraq.

F. OFFICER PERSONNEL FOR MODULAR BRIGADES

To expand the number of modular brigade combat teams from 33 to 42, the Army will require more junior officers in the ranks of captain and major to serve as commanders and staff officers.³⁴³ This has created a projected shortage of officers in these critical grades. The projected shortage is based on modularity initiatives rather than increased attrition. Numerous articles claim that officer attrition in these ranks has increased due to the strain of multiple deployments.³⁴⁴ These claims are inaccurate, as officer retention varies by less than one percent from historical peacetime rates.³⁴⁵ To make up for this projected shortage, the Army introduced a menu of incentives to junior officers in exchange for continued service. The incentives fall into two categories: bonus pay or training and education in the skills necessary for irregular warfare. 10,474 officers have elected to receive a \$35,000 bonus, while only 33 have chosen to receive language training at DLI or training at Ranger School, as of December 2007.³⁴⁶ Additionally, 174 officers have chosen to attend fully funded graduate school. Language skills and graduate level education are lacking among combat arms officers. Ranger School trains personnel in small unit leadership and dismounted infantry tactics, which may be necessary in irregular warfare. The fact that the Army considers training its officers for irregular warfare as part of a personal incentive

³⁴³ Charles Henning. "Army Officer Shortages: Background and Issues for Congress." *CRS Reports for Congress*. (Washington, DC: Congressional Research Service, 2006), 5.

³⁴⁴ *Ibid.*, 6.

³⁴⁵ *Ibid.*, 5. However, this minor increase in retention may be due to the stop-loss orders for officers in deploying units.

³⁴⁶ Jim Tice. "Service Extends Retention Bonus Deadline for Captains." *Army Times*. (24 December 2007), 28.

program reveals the institution's attitude towards irregular warfare. The Army is willing to fund advanced training useful in irregular warfare on a voluntary basis, as a personal incentive, rather than as a professional expectation. This has resulted in a lack of professionalism in the officer corps.

In 2003, journalists quoted a senior Army officer in the 4th Infantry Division saying, "The only thing these sand niggers understand is force and I'm about to introduce it to them."³⁴⁷ The perception that Iraqis only understand the language of force comes naturally for an officer corps in which the language of force is the only proficient language, other than English.³⁴⁸ This attitude will be further enabled by the long-range strike capabilities of the FCS. Psychologically, it is easier to kill people who are at a distance both socially and in terms of weapon systems ranges.³⁴⁹ A recent RAND computer simulation of a FCS brigade refighting the Kosovo War predicted an outcome with two interesting characteristics. First, in a vertical envelopment scenario, the brigade's offensive mission would eventually revert to one of defending the location of the brigade's airborne insertion.³⁵⁰ Second, the simulation calculated that reliance on long-range strike systems for the brigade's defense would result in 14,327 civilian casualties, based on the Circular Error Probable (CEP) of various FCS "precision" munitions.³⁵¹ This scenario echoes of the Battle of the Little Bighorn and the Battle of Ia Drang, but with more firepower.³⁵²

³⁴⁷ Michael Gordon and Bernard Trainor. *Cobra II: The Inside Story of the Invasion and Occupation of Iraq*. (New York: Pantheon Books, 2006), 447.

³⁴⁸ Marilyn Young. "Counterinsurgency, Now and Forever." in *Iraq and the Lessons of Vietnam*. (New York: W.W. Norton & Company, 2007), 224.

³⁴⁹ Dave Grossman. *On Killing: The Psychological Cost of Learning to Kill in War and Society*. (New York: Back Bay Books, 1996). Weapons ranges, social attitudes, and training are central components of the book's thesis.

³⁵⁰ John Matumura and others. *Future Combat Systems Program*. (Santa Monica: Arroyo Center RAND, 2002), Summary, xvii.

³⁵¹ Ibid. 74. This assumes a CEP range from as low as 3 meters and as high as 90 meters.

³⁵² In the Battle of the Little Bighorn, General Custer made his famous "last stand" when fighting against Crazy Horse and Sitting Bull, leaders of the Lakota and Cheyenne Indian tribes in Montana. This 1876 battle serves as a reminder of the vulnerability of cavalry units. The Battle of Ia Drang, in 1965, is a case of "air cavalry" being inserted into a jungle environment, and subsequently relying on massive firepower to survive until extracted from the location. The performance of the FCS in a similar situation will depend upon the ability to resupply fuel and munitions from the air, and close air support. This will probably result in a large amount of collateral damage, as the RAND study indicates.

G. INFANTRY: “SAVING THE CRUNCHIES”

Tankers refer to infantrymen as “crunchies,” a term that originates from the sound that breaking bones make when a tank runs over a dismounted foot soldier. When a Bradley drops its ramp to dismount the infantrymen carried under armor protection, this is referred to as “letting the crunchies loose.” Tank and mechanized infantry units operate as a team during both training and combat. During training exercises, infantrymen usually mark the spots on the ground where they sleep using chemical lights to avoid being run over accidentally by a tank while they are sleeping. In combat, tankers typically see their role in terms of “saving the crunchies.” This was evident with the use of Pakistani tanks and Malaysian armored vehicles to rescue Rangers from a hostile urban environment in Somalia in 1993, as well as the use of tanks in Fallujah by Marines.³⁵³ As an armor officer, Shinseki’s transformation vision is an institutional attempt to “save the crunchies,” as they are viewed in vulnerable terms from the perspective of the armor branch. The recent BRAC commission’s decision to move the armor school to Fort Benning (home of the infantry branch) and consolidate it with the infantry school may appear a bureaucratic triumph for infantry over armor. Nevertheless, it does not take account of fact that the traditions of armor involve fighting on the move. Infantry traditions involve fighting from stationary positions. These traditions continue in bureaucratic battles. The cavalry is not moving to the home of the infantry to offer peace, but instead to create a “maneuver branch” in which armor and infantry and more fully integrated.

In a recent article in the *Armed Forces Journal* retired Army General Robert Scales, an architect and proponent of the FCS stated:

First priority should go to those technologies that are most likely to lessen the cost of infantry combat. We know that mounted fighting diminishes the cost by an order of magnitude. The problem today is that our Cold War armored fleet carries too few infantry. Our vehicles are optimized for warfare in developed regions where weight, complexity and fuel efficiency are not impediments to tactical success. In the future, the fleet

³⁵³ Mark Bowden. *Black Hawk Down*. (Berkley: Atlantic Monthly Press, 1999), 271. The tanks used by Pakistan were American-made M-48s, and the Malaysian APCs were German-made Condors; Ahmed Hashim. *Insurgency and Counterinsurgency in Iraq*. (Ithica, Cornell University Press, 2006), 45.

must be modernized to allow more infantry to fight mounted in distant places for extended periods, to keep them under armor longer and to allow infantry to remain protected until very close to the enemy.³⁵⁴

American infantrymen have more protection in terms of body armor, vehicular armor, and medical care, than ever before. While this is a positive development, it reaches a point of diminishing marginal utility as it begins to inhibit the ability to perform tasks characteristic of irregular warfare that cannot be performed while in armored vehicles. Putting infantrymen in armored vehicles is not “transformational.” It is simply a continuation of Cold War efforts to mechanize the entire Army. The FCS program seeks to homogenize the Army by transforming light infantry divisions into mechanized divisions.³⁵⁵

During the 1970s, numerous Army officers argued that light infantry divisions should be completely eliminated from the force structure and replaced by heavy divisions that could make a real contribution in defending NATO against an attack by the Warsaw Pact. During the Cold War, critics of the light divisions stated:

The only mission for which these forces are suitable is that of a low-intensity, long-duration conflict—another Vietnam. Given the inadvisability and improbability of such a conflict, there is no visible justification for keeping these divisions in the force structure. One of these divisions or the 82nd Airborne should be converted to an armored division to support our NATO forces.³⁵⁶

Although, the 101st Infantry Division was also a light division, it used helicopters, and this exempted it from the concerns expressed above. This is because helicopters are used to mass the infantry of the 101st at critical points, which is fits with traditional Jominian notions of warfare. Although the light divisions were never fully converted to armored divisions, there was notable momentum towards this goal.

³⁵⁴ Robert Scales. “Infantry and National Priorities.” *Armed Forces Journal*. (December 2007). At: <http://www.armedforcesjournal.com/2007/12/3133328>. Accessed on 10 Dec 2007.

³⁵⁵ Peter Wilson, John Gordon, and David Johnson. “An Alternative Future Force: Building a Better Army.” *Parameters*. (Winter 2003) Carlisle, PA: U.S. Army War College Quarterly, 27.

³⁵⁶ William Lind and Robert Taft. *White Paper on Defense*, “A Modern Military Strategy for the United States.” By Senator Robert Taft prepared with the assistance of William S. Lind, Staff Aide to Senator Robert Taft, Jr., for Military Affairs. (Washington, D.C.: n., 1976), 83. Quoted by Christina Fishback in “Master’s Thesis Draft.” (Manhattan: Kansas State University, 2007), 81.

During the 1980s, the Army experimented with two light divisions at Fort Ord, California and Fort Lewis, Washington that were designed to provide more mobility, protection, and firepower for light infantry.³⁵⁷ These units were equipped with dune buggies that were mounted with .50 caliber machine guns and TOW missiles, with later designs suggesting the possibility of arming trucks with a ground-based hellfire missile system capable of destroying tanks.³⁵⁸ Additionally, scout platoons at Fort Ord were equipped with motorcycles.³⁵⁹ While these developments may have been no match for an opponent armed with T-72s, it would have been a significant increase in mobility, protection, and firepower for a force that was largely dependent on foot marches, digging foxholes, and rifle marksmanship for these functions. After the end of the Cold War, with the drawdown of forces, the Army reduced the number of divisions in its structure from 18 to 10, and in this process, the division at Fort Ord was disbanded.³⁶⁰ These old ideas, however, were resurrected with the Future Combat System.

³⁵⁷ John J. McGrath. *The Brigade: A History*. (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 82.

³⁵⁸ *Ibid.*, 83.

³⁵⁹ *Ibid.*

³⁶⁰ *Ibid.*

VI. CONCLUSION: TROUBLE WITH THE FCS MARKETING CONCEPT?

The numerous long-range precision strike systems of the FCS provide a capability similar to that of the Air Force. The Marine Corps has pointed out how the Army's attempt to design rapid deployment units is similar to the purpose of Marine units. The Army's pursuit of long-range strike and rapid deployment capabilities is ironic considering the fact that armies, though slow-moving and composed of short-range striking power, are already capable of the most precise application of violence and influence through human interaction and line-of-sight firepower. Bombing or sending Marines serves as temporary response to a strategic situation that lacks the same level of political commitment than a decision to employ the U.S. Army. The movement of the U.S. Army, with its heavy armored corps and vast logistical infrastructure serves to provide both permanent political commitment and tactical staying power. These capabilities and political dynamics are characteristically different from the capabilities provided by the Air Force or Marine Corps, as evident with their shorter length of deployment for their units. Political commitment and tactical staying power alone, however, do not necessarily translate into a strategic advantage in an offensive situation. Decreasing the weight of vehicles while increasing their striking range creates a force designed to remain on the defensive when deployed.

The domination of land – exerting control over territory and populations – cannot be performed by precision long-range strike systems. If such a feat could be accomplished in this manner, then there would be no need for an Army. At best, such systems can only serve to deny territory to an adversary, rather than actually dominate it.³⁶¹ If the United States wishes to exert control over foreign populations, even if done with a genuine attempt at implanting democratic governments through regime change, it must do so the same way the Roman Legions did, take a more radical approach to transformation, or wait for politicians to abandon current global endeavors.

³⁶¹ This became evident during World War I.

The Army recently produced several videos to promote the Future Combat System. These videos serve to inform soldiers about the new equipment, while also informing the public, the Executive Branch, and Congress of the Army's progress in transformation. The videos promote the idea that wars can be won with technology. The time-consuming preventive maintenance checks performed by soldiers on vehicles are portrayed as unnecessary with FCS vehicles, as computers can perform these tasks, and order repair parts based on predictive analysis before a part malfunctions.³⁶² Concerns about the complexity of the new equipment in terms of training are alleviated by mention of how remotely operated systems use the same hand-controller as the popular X-Box 360 video game system.³⁶³ This implies that most new teenage recruits play video games, and can therefore easily figure out how to play war also if they are simply provided the same hand-controller for both functions. While such equipment may increase the Army's capacity to manage remote destruction, the military profession entails more than simply managing destruction. The true course of the FCS program is revealed in the opening scene of one of the videos portraying a fictional FCS scenario. In this scene, a commander briefs an operations order to unit equipped with the FCS. Before getting into the details of the mission, as a way of stressing the significance of the mission to his soldiers, the commander enthusiastically states, "This is a new deal gentlemen... We're not chasing insurgents anymore."³⁶⁴ This "new deal" is nothing more than old wine in new bottles, poured to quench the growing thirst of Mars.

³⁶² "Ready to Go." *Future Combat Systems Scenarios*. At: <http://www.army.mil/fcs/multimedia.html>. The videos play better on www.youtube.com than on the Army's internet website. Accessed on 15 Jan 08.

³⁶³ "Pacbot." *Future Combat Systems Scenarios*. (31 January 2006) At: <http://www.army.mil/fcs/multimedia.html>. Accessed on 15 Jan 08.

³⁶⁴ "Vanguards." *Future Combat Systems Scenarios*. (26 October 2006) At: <http://www.army.mil/fcs/multimedia.html>. Accessed on 15 Jan 08.

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